

CIO

BUSINESS TECHNOLOGY LEADERSHIP

THE 2006
CIO 100
Innovation
FOR
Growth

- Revenue Generation
- Productivity Enhancement
- New Products
- New Markets

**THE 19TH ANNUAL
AWARDS ISSUE**
BEGINS ON PAGE 44

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_INFRASTRUCTURE LOG

_DAY 12: This is out of control. No one can get real-time answers. No one's collaborating. Web conferencing services are driving costs through the roof. Unmanaged public IM is a security nightmare. We need help.

_Gil brought in a "collaboration accelerator." I said it looked more like a cannon. He said I had a small mind.

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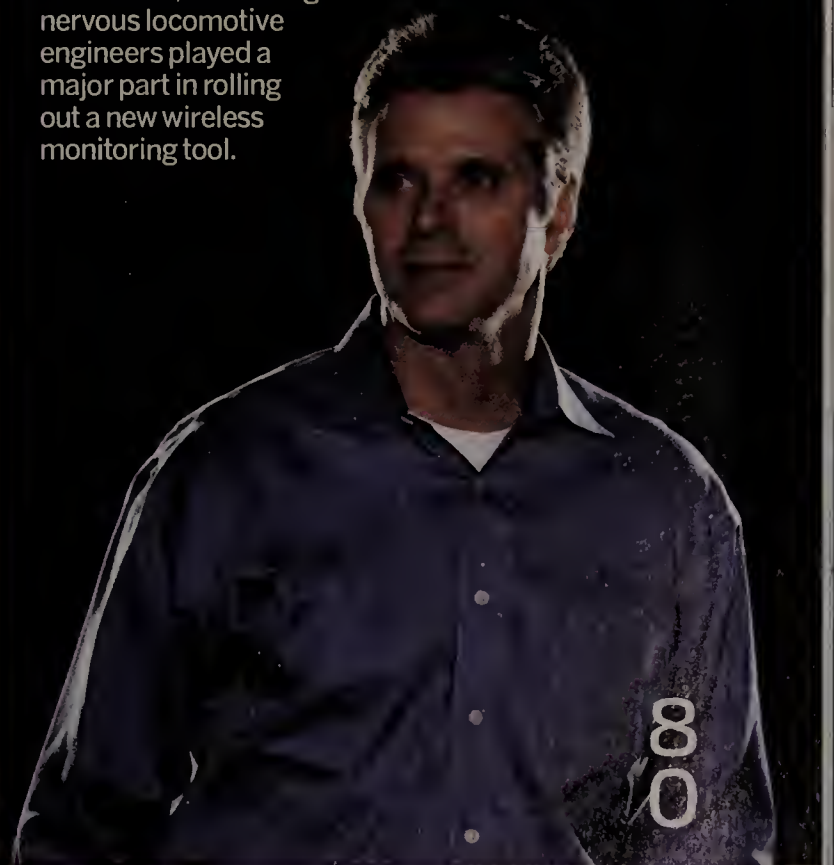
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CIO 100

Winning Ideas

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- ▶ Link to additional information about the technologies behind the winning projects and how they were executed
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[PODCASTS]

IS THE U.S. STILL TOPS IN INNOVATION?

Absolutely, according to CIOs and tech execs Editor in Chief Abbie Lundberg visited with recently. Hear why they think so. www.cio.com/podcasts/authors.html



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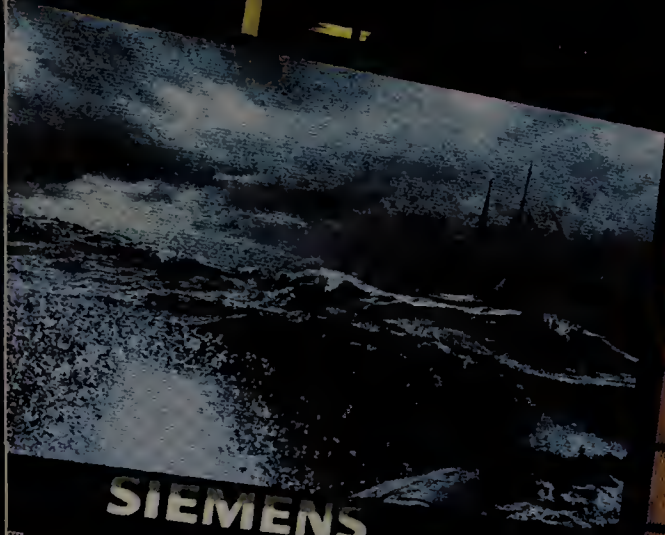
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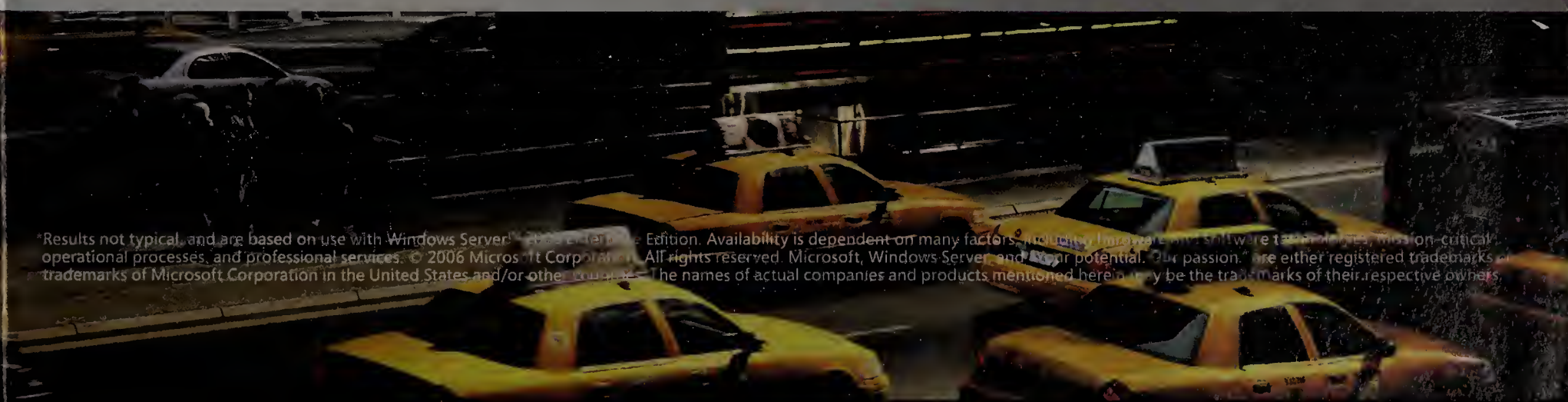
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What Does Innovation Look Like?

Our quest to give visual representation to technology-enabled business innovation and growth

Does innovation have a look and feel? How about growth? And how does that jibe with the look and feel of technology and business?

These were the questions we pondered as we set out to design the cover of this year's CIO 100 issue. Innovation, we thought, had to have energy and color and motion. It had to be fresh and somewhat surprising.

When we talked about growth, we focused on the organic. That brought to mind images of plants, children, flowers. Technology and business, on the other hand, inspired more mechanical, electrical and even urban icons.

The challenge was to marry these things that didn't seem to go together and present them in a beautiful way. But in the end, isn't this what innovation is all about: the combination of disparate elements in a way that hasn't been thought of before to create something of unique value?

Here's what didn't make it to the cover:

- A flower growing out of an egg. Simple, elegant, surprising...but not a lot of energy.
- An acorn with a mechanical top. That combined the mechanical and the organic... but again, no energy or motion.
- A lightbulb growing in a flowerpot, being watered. Says ideas, says growth...but could cause electrocution. (Don't try this at home!)

There were others, some pretty wack. In the end, we opted to look for a style we liked, then told the illustrator what we were thinking and turned him loose. The result is something we never would have come up with on our own.

The transmission tower in the foreground is bursting with flowers. The cityscape is both organic and futuristic. Even the current radiating from the tower combines the sharp edges of electricity with the round organic lines of nature. The formation of birds flying from right to left adds to the sense of movement and energy.

The issue is filled with its own interesting imagery from the CIO 100 enterprises' winning initiatives—the National Oceanic and Atmospheric Administration's underwater lab, Monsanto's seed-breeding program, Capital One's untethered workers, Discover Financial's cell phone wallet, Ohio State University Medical Center's servant robots—all of which involved the focused creativity of CIOs and their information systems groups.

Similarly, this year's CIO 100 project is the product of a talented team, led by an extremely dedicated individual. Starting in the fall of 2005, Executive Editor Elana Varon drove this project—from the creation of our new awards application through judging, idea development, story assignment and the final packaging of the whole. It truly wouldn't have happened without her. And it wouldn't look and read so well without the work of Associate Art Director Matt Goebel, who served as lead designer.

This is what innovation looks like to us. What does it look like to you?

The challenge was to marry things that didn't seem to go together and present them in a beautiful way.

A handwritten signature in dark ink, reading "Abbie Lundberg". The signature is fluid and cursive, with a large, stylized "A" and "L".

Abbie Lundberg, Editor in Chief
lundberg@cio.com

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FROM THE CEO

Cheers!

Congratulations to the CIO 100



Last month I challenged CIOs to show how they can be seen as leaders and innovators within their various organizations when, according to a recent Standish Group study, about 70 percent (on average) of the projects they undertake end up over budget, late or not to the original specs. I must have struck a chord because some of the letters I received really put me in my place.

▪ "Don't you understand that the CIO job is like trying to catch Jell-O!"

▪ "You try balancing everyone's demands for grow-

ing revenue, cutting costs, implementing SAP and being Sarbox-compliant and see how successful you are in delivering everything on time."

▪ "Sure would be nice if my CXO peers were clear about what they actually wanted rather than changing their minds every month."

And the best one of all: "Were you drinking when you wrote this column?"

Nope. Stone-cold sober. And I thought I was very clear about the fact that I see the CIO's role as one of the most important—if not *the* most important—job in business today. In fact, it is almost impossible to succeed in today's hypercompetitive environment without an excellent CIO leading the charge. That's why IT execution is so critical to all CIOs and their enterprises.

And that's why it is so exciting that next week *CIO* will be celebrating the CIO 100. Not only have the CIOs we will be honoring met their specific goals and objectives but they have actually driven innovation and growth within their respective organizations. They're an impressive group, and I look forward to joining them and raising a glass to say, "Well done. Cheers!"

Michael Friedenber, President and CEO
mfriedenber@cio.com



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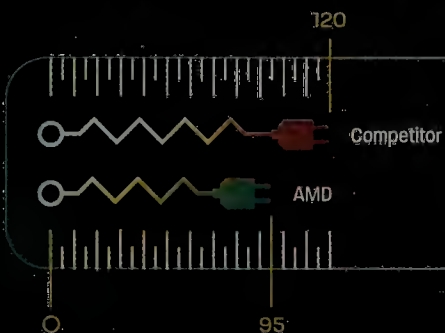
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SENIOR WRITERS

Meridith Levinson, Susannah Patton,
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CONTRIBUTORS

Ben Ames, Grant Gross, Galen Gruman,
Mike Hugos, Robert McMillan,
Michael Schrage, David Strom

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Jill Paquette

DESIGN

EXECUTIVE DIRECTOR, ART AND DESIGN
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ART DIRECTOR Terri Haas

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Meridith Levinson, mlevinson@cio.com

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Christopher Koch, ckoch@cio.com
Elana Varon, evaron@cio.com

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Stephanie Gelston, sgelston@cio.com
Stephanie Overby, soverby@cio.com

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Allan Holmes, aholmes@cio.com
Ben Worthen, bworthen@cio.com

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Christopher Lindquist, clindquist@cio.com
Laurianne McLaughlin, lmclaughlin@cio.com
Thomas Wailgum, twailgum@cio.com

GOVERNMENT

Allan Holmes, aholmes@cio.com

COLUMN & DEPARTMENT CONTACTS

Applied Insight

Christopher Koch, ckoch@cio.com

Book Reviews

Elana Varon, evaron@cio.com

By the Numbers

Laurianne McLaughlin, lmclaughlin@cio.com

Endlines

David Rosenbaum, drosenbaum@cio.com

Essential Technology

Laurianne McLaughlin, lmclaughlin@cio.com

Forum

David Rosenbaum, drosenbaum@cio.com

InBox

Cathy Mallen, cmallen@cio.com

Keynote

Elana Varon, evaron@cio.com

Martha Heller

Stephanie Gelston, sgelston@cio.com

Michael Schrage

Abbie Lundberg, lundberg@cio.com

On the Move

Meridith Levinson, mlevinson@cio.com

Peer to Peer

Elana Varon, evaron@cio.com

Susan Cramm

Stephanie Gelston, sgelston@cio.com

Total Leadership

Elana Varon, evaron@cio.com

Trendlines

Laurianne McLaughlin, lmclaughlin@cio.com

E-MAIL letters@cio.com **PHONE** 508 872-0080 **FAX** 508 879-7754 **ADDRESS** CIO Magazine, CXO Media Inc.,
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Not so long ago, executives on business trips and truck drivers looking for a delivery address or trying to track an order faced the same dilemma: separated from headquarters, they lived in a communications vacuum. Their tether was the telephone, through which—with the help of other people—they could check messages or track down vital information.

That era is long past, thanks to the advent of global networks, personal computers and handheld communications devices. But business communication is still far from seamless. New

technologies spawn multiple, competing operating platforms (the VHS-Betamax battle comes to mind), and enterprises large and small continue to search for fully integrated solutions. Technology, for all its benefits, often gets in the way of communication, instead of making it easy.

Companies searching for technology transparency and convergent solutions now have a new ally: Orange Business Services, the new enterprise arm of France Telecom. Equant, France Telecom and Orange now offer their combined business market expertise under Orange Business Services and

are defining what it means to be a truly global integrated operator. France Telecom, as a whole, serves more than 145 million customers in 220 countries and territories. The company also leads in supporting both basic and applied R&D through a multi-billion dollar commitment to 17 laboratories around the world. Strategically, lab priorities are centralized; tactically, the "how-to" decisions remain local. The labs collaborate but also work independently while serving as the

FTgroup's eyes and ears in their home markets, such as Boston's Route 128, California's Silicon Valley, and other technology centers ranging from Beijing to Warsaw.

Part of the Ecosystem

"We are like chameleons: Our labs reflect the ecosystem of the places they're located," says Gabriel Sidhom, vice president of technology development for FTgroup, Division R&D, San Francisco. "For instance, there are



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a number of small start-up companies in our area that are actually generating revenues from delivering television broadcasts on mobile devices. Live TV and mobile video are a major area of emphasis for FTgroup's research and development worldwide, so we collaborate with several of these companies while we pursue our own solutions as well."

Telco-sponsored research has a long and rich history in the United States. Bell Laboratories developed the transistor, along with hundreds of other inventions, earning a reputation for brilliant innovation more than 50 years ago. Since the Telecommunications Act of 1996 became law, however, R&D has fallen on hard times here. The telecom market implosion of 2001-02 further depressed investment in both fundamental and applied research by the major network providers. So, the FTgroup decision

to increase spending on R&D to 2% of total revenues by 2008 stands out.

Enterprise-level customers should care about research, because innovation can be linked directly to profits. "People often think fundamental research is about pie-in-the-sky stuff," says Sidhom. "You can certainly point to cases where ideas have taken a long time to come to fruition, but there are many examples of products and solutions that have come to market quickly and made a bottom-line difference."

Digging for Information Gold

A brief survey of sample lab projects in Boston helps to prove this point. Consider "*Destiny*." Already deployed in France Telecom and in at least one other location in North America, this "futures marketplace" allows employees to "invest" in possible

future technologies, just as one would invest in the stock market.

The incentive to participate is a financial account in the employee's name. Although this currency is symbolic right now, employees pay attention to the outcomes as if it were real money. Questions must be phrased to enable a "yes/no" answer, and multiple factors, such as consensus opinions from outside sources, are weighed in assigning probabilities to help contestants invest.

For example, a current question on the France Telecom "*Destiny*" site is: "Will VOIP in France reach 40% penetration?" Correct answers to these and similar questions increase or reduce a theoretical bank account denominated in Euros.

While this example is playful, there are serious benefits to be gained by deploying the tool on an enterprise basis. For instance, a test now underway at a

client solicits opinions from 300 individual engineers about specific strategic and tactical decisions vital to manufacturing processes and products. The answers are anonymous, encouraging candor. The company in question would have no effective way, other than face-to-face meetings with all, to gather this information. "We all know what often happens in group meetings," says Lorrie LeJeune, a researcher from the FT R&D lab in Boston. "Either the same five people always express their opinions while everyone else stays quiet, or the random person put on the spot says something designed to please rather than offend. How can managers learn what their own people really think? Successful companies realize that their employees are an incredibly valuable guidance system, and this tool helps them use it."

Another way to im-



prove performance or avoid trouble is listening to what customers have to say. It may take years to build a brand, but today it can take less than a month to destroy it. A half century ago, management icon Peter Drucker advanced the theory of "outside-in" thinking as vital to cor-

ing solutions that will let organizations monitor these opinions both anecdotally and statistically. What these analyses reveal may thrill or alarm, but monitoring these important sources could prevent companies from suffering the fate of a well-known security device manufacturer that

identify and access specific, pre-determined collections of data or information on their cell phone or PDA displays with a single click, rather than hunting and pecking on tiny keypads. The data sets could range from a contact database, a customer service record or a customized real-time update of stock quotes from an individual's portfolio. "This is

surprisingly, the labs are developing a number of solutions to enable enterprise customers to use them more efficiently. One such platform allows voice, data and video conferencing from a single desktop with no handset interface. The platform also incorporates instant messaging and contact databases as part of a group of screen icons. Imagine that you are in

We are like chameleons: our labs reflect the ecosystem of the places they're located. — *Gabriel Sidhom, vice president of Technology Development, FTgroup, Division R&D, San Francisco*

porate success. Then, companies knew more about their products or services than the people who bought them. Today, the opposite is often true. Blogs, message boards and opinion sites are gold mines of useful opinion, good and bad. But, how do you monitor more than 30 million sites with constantly changing content? Orange, in partnership with others, is develop-

saw its sales plummet in a matter of weeks after a single blogger revealed that he could compromise its supposedly impregnable product using a simple pin.

The end of "hunt and peck"
Then, there's the humble widget. Ubiquitous on computer desktops, these icons are at the center of a new Orange application that will allow users to

all about simplicity and convenience," says Parker Llewellyn, director of sponsor relations and partnerships at FTgroup's Boston lab. "In the past, customer relationships with telecom providers have been based on access to networks. Tomorrow, they will be based on access to services."

Networks, of course, are still at the heart of Orange's business. Not

your New York office and want to discuss a project with a colleague in London. You need to share files and diagrams as part of the discussion. Selecting your colleague's name from your contact database will instantly reveal whether he or she is in the office, available or unavailable, and place a call that allows both users to see each other and the necessary files on the display. While a tech-

nology-savvy executive could accomplish some of this by combining calls over a traditional network with an application like GoToMeeting™, the convenience of the contact database, instant intelligence about availability and video functions would require leaving your office and going to a separate video conference facility, at the very least.

institutions, such as Stanford, the University of California at Berkeley, UCLA and the University of Southern California.

Not your father's network provider

If this doesn't sound anything like your classic network provider, that is exactly Orange's intention. "We use innovation

and customer relationship. Currently, there are more than a dozen collaborations under way between the labs and corporate partners.

The future of both consumer and corporate communications will be based on integrating multiple media and delivering access from multiple platforms. From an enterprise perspective, it will be necessary, as

voice, data and video communication have not yet fully arrived at that point, but they will. Orange Business Services and the FTgroup are leading the way.

Relationships with telecom providers have been based on access to networks. Tomorrow, they will be based on access to services. — Parker Llewellyn, director of sponsor relations and partnerships at FTgroup's Boston lab.

Supporting academic research

France Telecom R&D's Boston lab also sponsors several ongoing investigations at MIT's world-renowned Media Laboratory by exploring technology solutions that may take somewhat longer to bring to market than the examples cited above. The San Francisco lab also works closely with academic

to separate ourselves from our competitors," says Brenda Belleville, director of marketing for the company. "We want people to get excited about the future of communication and encourage them to work with us to bring the future into the present." Customer and prospect visits to the Boston and San Francisco labs are now a featured part of the Orange Business Services

a matter of survival and competitive parity, to remove the barriers that currently separate the amount of information available in the office from information available anywhere. The original beauty of telephony was that users came to assume its use as a normal part of daily living, without giving a moment's thought to the technology behind their calls. Integrated

For more information about FTgroup innovations and partnering with Orange Business Services, visit orange-ft.com.



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trendlines

EDITED BY ELANA VARON

NEW * HOT * UNEXPECTED

Cleveland owes its recent growth in part to its broadband infrastructure.



Cleveland's Claim to Digital Fame

INFRASTRUCTURE Cleveland missed out on the economic boom of the 1990s, which was largely driven by knowledge work. Only about 20 percent of the area's residents have college degrees, and the local economy is still dominated by manufacturing. During the past decade, employment and wage growth in Northeast Ohio were about half the national average, and between 2000 and 2002, taxable income dropped by \$2 billion.

In an earlier era urban planners made policy decisions that reshaped cities for the industrial age. Lev Gonick, CIO of Case Western Reserve University in Cleveland, believed

the city could stop its downward spiral and reshape itself for the information age through public investment in IT infrastructure. That idea became the OneCleveland project, which earned Case Western a 2006 CIO 100 Award. (Find the full coverage of this year's honorees beginning on Page 44.)

By 2002, telecommunications companies had laid thousands of miles of fiber optic cable in the Cleveland area that were underused. Gonick pitched local business and nonprofit leaders the idea that they could use the unlit fiber to create an ultra-high-speed net-

Continued on Page 24

Don't Be Surprised When Your Laptop Breaks

MOBILE COMPUTING It's unlikely your laptop will catch fire, as a Dell notebook did in Japan earlier this summer. But nearly one-fifth of all notebook PCs will break down during their lifetime, needing a new hardware component to fix the failure, according to a Gartner study. Motherboards and hard drives fail most frequently.

Desktops suffer from the same weaknesses, but they break less often. Five percent of new desktops will break within 12 months, and 12 percent will break within four years, Gartner esti-

mates. In comparison, 15 percent of laptops will break within a year, and 22 percent within four years.

Broken screens used to be the most common laptop failure, says Leslie Fiering, research vice president at Gartner. But manufacturers have reduced screen breakage by making the notebook casing and screen bezel more rigid, and by providing more clearance between the screen and keyboard when the lid is closed.

Now motherboards are more complex. Technicians used to be able to replace parts like a network interface

card, but today such parts are integrated into the motherboard. The entire motherboard must be replaced to fix one component.

Such repairs average five days, depending on how busy technicians are, at a cost of at least \$250 in lost productivity and administrative expenses.

After motherboards and hard drives, the next most common notebook hardware failures are latches and hinges on the chassis, lost key caps and the aftermath of drinks spilled on the keyboard.

-Ben Ames

LAWSUIT ALLEGES PROGRAMMER VISA ABUSES

STAFFING A group representing IT workers has begun filing about 380 lawsuits against U.S. companies who advertise, in violation of the U.S. law, that they prefer to hire foreign workers with H-1B temporary work visas.

The Programmers Guild filed about 100 complaints in May and June, with plans to file about 280 more by November, says John Miano, founder of the Guild. The federal Immigration and Nationality Act requires that U.S. jobs must be available to U.S. workers, meaning that companies are not allowed to advertise for foreign workers exclusively.

The complaints stem from ads with wording such as "We require candidates for H-1B from India" and "We sponsor GC [green card] and we do prefer H-1B holders." The Programmers Guild, looking for ads on major online job boards such as Dice.com and Monster.com, has so far targeted only those seeking computer programmers.

Miano says most of the ads are from so-called body shops that provide contract labor—among them Reasonsoft and Enterprise Business Solutions—and not from big-name IT vendors. Some of the ads come from recruiters working out of apartments, the group claims.

Miano says the complaints are intended to highlight problems with the H-1B program, which vendors use to hire workers for positions they say are hard to fill. Congress has been considering an increase from 65,000 to 115,000 in the annual number of H-1B visas issued.

The Information Technology Industry Council (ITI), a trade group representing about 40 large IT vendors, says an increase in the H-1B cap is needed even if some abuses exist. ITI member companies are not violating hiring laws, says Kara Calvert, ITI's director of government relations. "If people are breaking the rules, they should pay the price."

—Grant Gross

Hot Jobs

I.T. SKILLS A survey of 1,400 CIOs by consultancy Robert Half Technology found the greatest demand for Windows administration and networking skills.

SKILLS NEEDED



SOURCE: Robert Half Technology

Cleveland

Continued from Page 23

work for local schools, nonprofits and business incubator spaces. Gonick argued that the network could help to make Cleveland an attractive location for entrepreneurs.

Then-Mayor Jane Campbell liked the idea and helped organize OneCleveland, a nonprofit corporation dedicated to pursuing Gonick's vision. Case Western invested more than \$2 million to buy the unlit fiber for the project. The telecommunications vendor City Signal Communications donated over \$1 million worth of additional fiber, and Cisco donated the network equipment needed to make it operational.

Today more than 300 community organizations are connected to the OneCleveland network, including 46 health-care facilities and 100 schools. The network has also spurred private investment, most notably by biotech companies whose researchers have access through the network to grid computing resources donated by IBM. (Northeast Ohio biotech companies received \$171 million in venture capital last year.) Cleveland rose to the top 25 last year in Entrepreneur.com's ranking of best cities for entrepreneurs, up from dead-last in 2002. And the Intelligent Community Forum, a nonprofit think tank that focuses on job creation and economic development, named Cleveland one of the top seven digital communities in the world.

What's more, OneCleveland is viewed by municipal leaders around the world as a potential model for public investment in technology for economic development. Gonick has become the group's ambassador. Over the course of two months this spring, Gonick recounted his story in Tuscon, Canada, Israel and Germany and to a class at Harvard's Kennedy School of Government attended by officials from all over, including Boise and Singapore.

"If you can do it in Cleveland you can do it anywhere," ex-mayor Campbell, who lost her bid for reelection last November, tells the audience at Harvard (where she spent the first half of 2006 as a fellow). "This is the future of the urban landscape," says Gonick. "I think it is as fundamental as the smokestacks of another era."

—Ben Worthen

Powerful, integrated, yet easy-to-use management tools hold the key to achieving—and maintaining—proper security

Security Management



ADAM MCCAULEY

MISCONFIGURATIONS AND UNPATCHED VULNERABILITIES ARE THE MOST OFTEN CITED REASONS FOR ATTACKS ON CORPORATE NETWORKS. PROPERLY CONFIGURED SYSTEMS ARE ESSENTIAL FOR SECURITY IN ANY ORGANIZATION, NO MATTER HOW LARGE OR SMALL. IT MAY SEEM LIKE AN INSURMOUNTABLE TASK TO PREVENT EVERY MISCONFIGURATION, BUT TECHNOLOGY CAN PLAY A CRUCIAL ROLE. READ ON TO LEARN HOW MANAGEMENT TOOLS CAN HELP REDUCE THE EFFORT TO MANAGE SECURITY.

IT decision makers these days are necessarily conscious and, to varying degrees, vigilant about keeping their networks secure. To some, vigilance may mean ensuring they have firewalls and antivirus, intrusion detection and other security tools in place. While that's certainly a good start, proper security also requires vigilance in a more basic IT discipline: network and systems management.

Far too many attacks on corporate networks stem from misconfigured systems. Whether it's a server that's running services it doesn't need, an antivirus program that's inadvertently left turned off on an end user's desktop, or an administrator's password that was never changed from the factory default, examples abound of configuration mistakes that leave networks vulnerable.

After analyzing more than 740,000 Web server attacks for a recent report, www.zone-h.org data indicates that the single largest factor in successful attacks was administrator misconfiguration, the cause in 33 percent of incidents studied. The second largest factor was unpatched vulnerabilities, found in 25 percent of the attacks. While much of the industry is focused on vulnerabilities and patching to prevent attacks, the Microsoft security strategy encompasses the bigger picture to also drive improved security management technology.

It may seem like an insurmountable task to prevent every case of system misconfiguration, most of which essentially result from human error. But in fact, it's an area where technology can play a crucial role, in the form of management systems that act as automated policemen, ensuring all systems keep in line with an organization's defined security policy. With the right mix of tools, it takes no more than a qualified systems administrator to ensure vigilance in terms of managing for proper security.

Such tools should help enable IT to ensure, from a central location, that all server, desktop and mobile systems remain configured according to your designated security

policy. They should also help you define those policies in the first place, with a high level of granularity to address the diverse roles that individuals play within an organization. And the tools should enable you to produce reports that will help you identify trends that can lead to improved management—and hence improved security. Finally, the tools should be scalable enough to handle even the largest networks, with tens of thousands of end points.

every aspect of a Windows network. First introduced with Windows Server 2000, Active Directory has seen continued improvements that have fashioned it into a true enterprise-ready directory infrastructure. Many of those improvements pertain to security.

For example, Active Directory enables enterprises to implement single sign-on to an array of popular applications. That, in turn, improves security by requiring users to remember only one user ID and password,

“The ability to keep our systems reliable and secure depends on more than just the robustness of the software itself. It also requires an ability on our part to properly manage and support the solution.”

—RICK DEMPSEY, CIO, SPECTRUM BRANDS (FORMERLY RAYOVAC)

Armed with such management tools, the IT administrator's job becomes far more predictable, and security incidents far less common. With less time spent in reactive mode, IT has more time to spend on strategic initiatives.

THE MICROSOFT DIRECTORY ADVANTAGE

Customers that employ a Microsoft® Windows® environment have an array of management tools at their disposal to help them keep a sound security posture. At the core is Active Directory®, which provides a central repository for information on all network users and infrastructure, including information used in identity management. Active Directory works hand-in-hand with Group Policy, which enables IT to efficiently manage groups of users within the organization. Group Policy makes it simple to apply granular security policies to the various groups within an organization, including those that dictate proper system configuration. Microsoft Windows Server™ 2003 also includes certificate management tools that make it simple for customers to apply strong, X.509-based authentication for any user or applications that require it. Additionally, an array of no-cost add-on tools is available to help users with crucial tasks.

Microsoft's approach reflects years of development in its directory and policy management tools. The capabilities built into Active Directory and Group Policy enable them to go far beyond simple identity management, which is the chief function of open source directories such as OpenLDAP. The ability to add policy, and to apply that policy to thousands of systems, groups and individuals, puts Active Directory in a different category from open source directories. Indeed, major Linux vendors such as Red Hat and Novell essentially admit as much, given that they each offer their own proprietary directories—at an additional cost—as an upgrade to the OpenLDAP included in most distributions. Even then, the directories are largely limited to identity management information. Both vendors offer yet more tools to provide some of the Group Policy management capability that is standard with Active Directory on Windows Server.

Indeed, Active Directory is integrated into virtually

dramatically reducing the chances that they will risk an unauthorized login by writing down their password—the classic sticky-note problem.

How great of a challenge is single sign-on? By some estimates, employees at many organizations spend over 15 minutes per day signing in to different operating systems, directory services and applications. This means that multiple authentication mechanisms in an organization with 10,000 computer users consume up to 2,666 hours every day. (Source: META Group research conducted on behalf of PricewaterhouseCoopers, June 2002. <http://www.microsoft.com/technet/security/topics/identitymanagement/idmanage/P3Intran.msp?mfr=true>.)

Beyond security considerations, there are clear business benefits to enabling single sign-on, including: **IMPROVED USER PRODUCTIVITY.** If the amount of time that computer users spend on authentication can be reduced from 16 minutes to 2 minutes per day, an organization of 10,000 users can reclaim more than 2,300 hours each day, which is roughly the number of hours worked by one full-time employee in a year.

REDUCED HELPDESK COSTS. Fewer logon credentials for users to remember increases their ability to follow security policy and reduces Helpdesk calls from users for password resets.

INFRASTRUCTURE CONSOLIDATION. The creation of an environment for platform and application integration allows organizations to consolidate identity stores, which reduces both administrative and licensing costs.

REDUCED ADMINISTRATION. Cross-platform access management for a majority of an organization's applications helps it to realize an even greater return on the investment made to consolidate the identity stores.

Another area where Microsoft has tightly integrated security technology, thus making it easier to manage, is Public Key Infrastructure (PKI). PKI technology has long been widely recognized to be a strong solution for providing electronic credentials used to give end users access to a range of resources and applications. But throughout the 1990s, companies struggled to implement PKI because of the complexity involved in rolling out the various components, including digital certificates, a certificate authority (CA) to issue and vouch for the authen-

WHAT CUSTOMERS SAY

On Windows Security

"Linux presented unacceptable risk in the areas of reliability and security. The ability to keep our systems reliable and secure depends on more than just the robustness of the software itself. It also requires an ability on our part to properly manage and support the solution, which in turn depends on the depth and capability of the vendor's support organization—an area where Windows is a known good and Linux is a total unknown." —**Rick Dempsey, Chief Information Officer, Spectrum Brands (formerly Rayovac)**

"Both the state and the public are concerned about security, and we did not feel comfortable taking on the risks associated with open source software at this time. The solution based on Microsoft technology delivers the control that we need now." —**Jim Matthews, Chief Information Officer, State of Illinois Bureau of Communication and Computer Services**

On Microsoft Solutions

"We want to continue to minimize healthcare costs, reduce medical errors and enhance the quality of patient care; using the Microsoft .Net Framework will help us do so in a timely, cost-effective manner." —**Kyle Anderson, Director of Enterprise Systems, Intermountain Healthcare**

ticity of those certificates, and an enrollment system.

All that changed when Microsoft implemented Certificate Services in Windows Server 2003. Certificate Services is a complete PKI implementation, including a CA with unique auto-enrollment capabilities. A role-based administration feature enables organizations to separate responsibility for managing and maintaining the CA, such as by allowing managers to manage certificates for users in their groups. Auto-enrollment allows certificates to be issued automatically to computers or individual users, with no awareness required on the part of the user. Active Directory is used to store and serve the X.509 certificates that are at the heart of the system.

An enhancement that debuted with Windows Server 2003 R2 brings Unix integration to Active Directory, enabling it to be a master Network Information System (NIS) server. That allows for synchronization of user passwords in Unix and Windows environments. Microsoft also introduced Active Directory Federation Services with R2, which provides Web-based authentication for extranet applications and cross-domain identity federation.

THE POLICY PICTURE

Group Policy, meanwhile, lets administrators easily define, implement and enforce their digital security policies. Policies reduce administrator workload by

automating various processes that would be difficult or impossible for administrators to enforce manually. With Group Policy, an administrator can define the desired security profile of a system once and apply it globally to all similarly configured systems. As each machine accesses Active Directory, such as upon login, any changes to the policy can be automatically downloaded and enforced.

For example, a password policy could dictate how long passwords must be and how often they must change. If a user attempts to log on to the network with an insufficient or expired password, the login will be denied until the user remedies the problem.

The Microsoft Group Policy Management Console (GPMC) simplifies management of all Group Policy-related tasks, enabling administrators to manage Group Policy for multiple domains and sites within a given organization from a simple drag-and-drop user interface.

TOOLS, TOOLS AND MORE TOOLS

Active Directory and Group Policy are both included with Windows Server 2003 at no extra charge. Microsoft also offers a range of free add-on tools to help users maintain sound security. They include:

WINDOWS SERVER UPDATE SERVICES, which helps customers keep up to date with patches and other product updates. The tool enables administrators to automatically receive patches and updates from Microsoft and distribute them to networked servers and clients.

SECURITY CONFIGURATION WIZARD, a tool that makes it simple to configure a server with the optimum security profile for the particular role it will play.

IIS LOCKDOWN TOOL, to help ensure the Internet Information Server Web server is configured for optimum security. Working with built-in profiles for different IIS server roles, the tool turns off features that are unnecessary for each role, thereby reducing the vulnerable surfaces available to attackers.

MICROSOFT SECURITY BASELINE ANALYZER, which helps small and midsize businesses determine their security state and offers remediation guidance. The tool detects common misconfigurations and missing security updates.

THE MICROSOFT UPDATE SITE, to help consumers and small businesses stay up to date with the latest product updates, which in turn, help stop the spread of viruses and worms to corporate networks.

Microsoft also now issues Security Bulletins on the second Tuesday of each month, a predictable schedule that enables customers to prepare. And with the various tools at their disposal, virtually any experienced Windows administrator can ensure proper security, not just expensive security professionals.

OPEN SOURCE ALTERNATIVES

Experience is a key consideration for organizations that attempt to provide security management in an open source environment. Without the array of tools that their Windows counterparts have for security management, Linux administrators are often forced to resort to custom configuration to implement security management. That could leave the organization exposed should the admin-

istrator who created the custom environment leave the organization, taking his security knowledge with him.

The lack of advanced management tools also makes security management more costly in an open source environment. In a Microsoft-sponsored study in April 2005 by Wipro Technologies compared the total costs involved in patching Windows systems versus open source software (OSS). The study took into account all the elements that go into the patching process, including investment in patch management tools, vulnerability research and monitoring, and ongoing patch management support costs.

Wipro found annual costs for patching Windows clients, servers and database servers to be \$1,622 per system, or 44 percent less than the \$2,903 annual tab to patch comparable OSS systems. The investment required in patch management tools showed an even greater discrepancy of 83 percent, based on an annual per-system cost of \$48 for Windows and \$286 for OSS. "More importantly, individual Windows systems require roughly 14 hours per year of support effort versus 32 hours for OSS systems," the report said.

The Yankee Group came to a similar conclusion in a July 2005 study based on a survey of 550 IT managers and C-level executives. "Survey respondents reported they have reduced the time spent on applying and distributing Windows updates and patches by 50 percent to 80 percent since Microsoft went to a monthly schedule of patch management releases in the fall of 2004. "Additionally, the availability of free Microsoft patch management utilities means there is no incremental cost to the user," the report says. "Although patch management issues have eased for Windows networks, they are worsening for Linux servers. Linux IT administrators report they spend on average 15 to 23 percent longer — approximately two to five hours more per week—on patch management distribution compared to the same period in 2004."

In addition to the management tools that Microsoft offers, the deep integration of Active Directory, with its various security management offerings, saves users money. As noted earlier, OpenLDAP does not offer the same kind of deep integration with various identity management and other security-related tools that Active Directory does. That leaves users to choose from the proprietary directories offered by vendors such as Novell and Red Hat, along with their various management tools, both of which eat into any cost savings that Linux purports to provide.

Even then, integration may not be on the same level as with Active Directory. In an October 2005 report, Dickerson Technologies compared Windows- and Linux-based PKI solutions. Regarding Novell's directory, the report said, "The Certificate Services in eDirectory seem to lack ease of management advances similar to the auto enrollment capabilities provided by Windows Server 2003." The report came to the same conclusion regarding Red Hat Directory Server and Red Hat Certificate System, the former Netscape products that Red Hat acquired from AOL in 2004. Dickerson also noted the Red Hat products are offered under separate subscription

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<http://www.microsoft.com/technet/community/columns/secmgmt/smarch.mspx>

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[zip http://www.zone-h.org/component/option,com_remository/Itemid,47/func,select/id,60/orderby,2/page,6](http://www.zone-h.org/component/option,com_remository/Itemid,47/func,select/id,60/orderby,2/page,6)

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Wipro Technologies report: The Total Cost of Security Patch Management http://download.microsoft.com/download/1/7/b/17b54d06-1550-4011-9253-9484f769fe9f/TCO_SPM_Wipro.pdf

Microsoft Get The Facts on Security <http://www.microsoft.com/windowsserver/facts/topics/security.mspix>

Think Security: Jeff Jones Security Blog <http://blogs.technet.com/security>

licenses from its directory, adding to the price tag.

CONCLUSION

Keeping systems properly configured is essential for maintaining security in any organization, no matter how large or small. While it may seem daunting, a sound directory structure and associated management tools turn the job into one that can be performed by most any experienced administrator.

The key is to start with an advanced directory that offers deep integration with various management tools and security services, such as PKI. Active Directory and Group Policy have been proven to provide sound security management for even the largest organizations.

Augmented by the various tools that Microsoft provides to help companies analyze their security posture and keep up to date with any required updates, Active Directory can also help reduce the time that administrators spend on ensuring proper security, leaving them free to pursue strategic projects that can provide a competitive edge.

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Spam's New Image

E-MAIL Just when you thought you'd mastered the art of filtering spam, the spammers have crafted another way to infiltrate your inbox: images.

Spammers are now using .gif or .jpeg files to embed their pitches for pharmaceuticals and penny stocks. Because this image-based spam typically doesn't contain any text, it's harder for filters that look for known URLs or suspicious words to block them.

Antispam vendor Cloudmark sets traps, known as honeypots, to lure spammers to its network, and the company reports that half of the incoming spam it snares consists of images. "About a year and a half ago we started seeing a little bit of it, but it wasn't until the past six months that it became a serious issue," says Adam O'Donnell, a senior research scientist with the company.

Meanwhile, Craig Sprosts, senior product manager with IronPort Systems, says image-based spam has jumped from about 1 percent of all spam messages in June 2005 to around 12 percent today. This growth is helping to fuel a global resurgence in spamming, Sprosts says.

Spammers now generate an estimated 55 billion messages per day, according to IronPort. A year ago that number was 30 billion. The combination of greater volume and more sophisticated techniques has meant more complaints for network administrators.

"I've had users complaining in the last few weeks about the overall increase in spam and I've personally noticed an increase in the percentage of it that's image-based," said Jonathan Forster, computing manager with the University of Arizona's psychology department.

Administrators at electronics distributor Avnet have started stripping certain embedded image files out of all messages after seeing an uptick in image-based spam two months ago, said Rob Kudray, manager of messaging services.

—Robert McMillan



Deconstructing Team Dynamics

MANAGEMENT Teams perform better when they share similar ideas about how to get things done, according to research from the University of Pennsylvania's Wharton School.

Katherine Klein, a professor of management at Wharton, and her colleagues examined what they call the shared mental models of work groups—how team members organize their tasks and determine their goals. Klein observed that when team members think alike about how to execute a project, they are able to anticipate one another's actions and coordinate their behavior. Thus, they are likely to perform better than teams whose members have different ideas about how a project should proceed, says Klein.

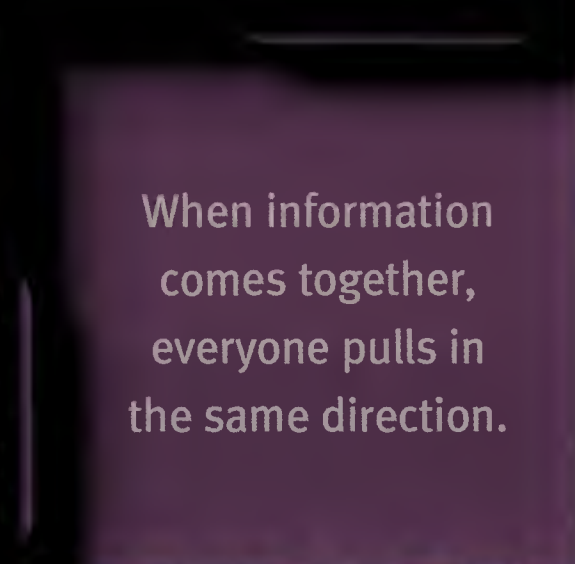
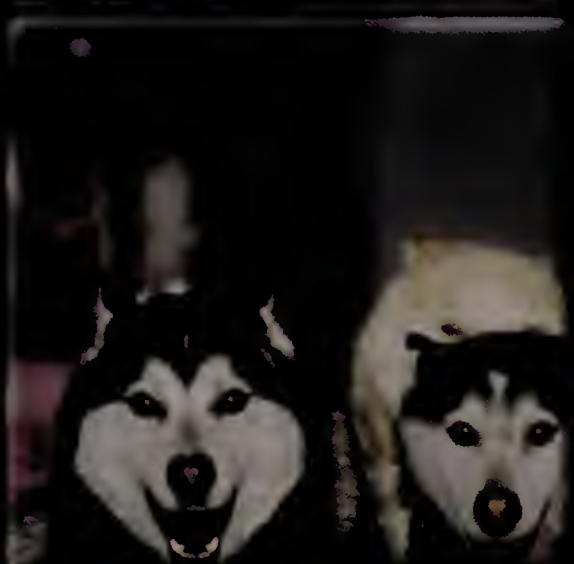
Provided the team shares "mental models about goals, values and priorities," it's also important that team members possess a diverse set of skills, she says.

Klein also studied the interpersonal dynamics among team members. She found that the most valuable members of a team are high in both intellectual and social capital, meaning they are experienced and even-tempered. Team members who exhibit these traits are more likely to have good relationships with other group members, and individuals are more likely to come to them for advice.

At the other end of the spectrum are the "social loafers"—team members who rely on others to get things done. There can be social loafers in both large and small groups. Having a leader who is clear about task delegation and deadlines—and who provides a structure for the team's work—discourages loafing, says Klein. Performance evaluations that incorporate 360-degree feedback also help. If individuals value their coworker's opinions, Klein says, they may feel a greater sense of accountability due to social pressure.

—Katherine Walsh

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by the numbers

BY DIANN DANIEL

TRENDLINES

Networks of the Future

With VPN investments, companies prepare for emerging applications

Increased corporate investment in new virtual private networking technologies indicates that companies now recognize the Internet as a business-class network, according to a survey by Forrester Research.

Forrester found that deployment of state-of-the-art VPN technology has increased as much as 80 percent during the past year. VPNs eliminate the need for dedicated connections to corporate systems by carving out private space across a shared network such as the Internet. Most of the 735 telecommunications decision-makers surveyed were replacing their existing VPNs.

61% of enterprises are interested in outsourcing management of their VPNs within three years

SOURCE: Forrester Research

The survey findings mean that companies are preparing to support emerging applications—such as voice over IP that require converged voice and data networks—to enable employees to become more mobile. “We’re at a tipping point in terms of people upgrading connectivity,” says Robert Whiteley, an analyst at Forrester.

The survey showed a spike in adoption rates of two VPN technologies: multiprotocol label switching (MPLS) and remote access SSL. MPLS enables companies to manage network traffic according to priority and is popular for converged networks carrying voice, video and data. Remote access SSL is a widely used encryption protocol.

Despite the multimillion-dollar investment required to implement MPLS (large enterprises typically spend around \$3 million for a global network), the percentage of companies that are implementing MPLS grew to 60 percent, compared with 29 percent in 2005. Whiteley says security, reliability and cost reduction are driving MPLS adoption. For example, the ability to prioritize traffic protects business continuity, so that an event like a denial of service attack would not affect critical applications such as voice and SAP.

Deployment of SSL also increased. Last year 34 percent of companies were implementing the technology; that number swelled this year to 53 percent. Whiteley says the interest in SSL supports the idea that employees are becoming more mobile.

Best Practices

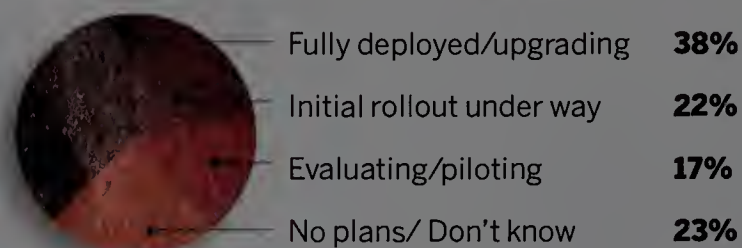
1. Plan ahead. Look now into upgrading your VPN for potential savings down the road. Although the initial investment in MPLS can be high, the savings from operating a converged network will begin in around 18 months. Remote access SSL pays for itself in as little as six to eight months.

2. Consider the big picture. “Old” VPN technologies (such as frame relay) may become a bottleneck to deploying emerging technologies, says Whiteley, due to their limited bandwidth, higher latency (how much time it takes for a packet of data to get from one point to another) and higher operational costs, among other issues.

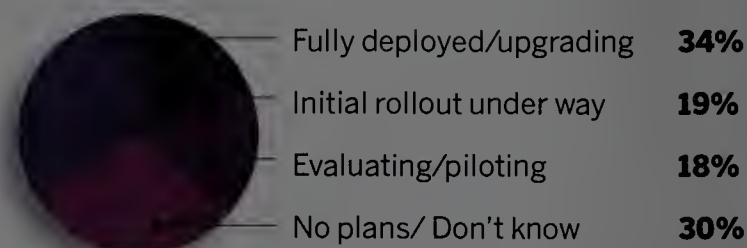
3. Revisit rejected projects. Projects such as ERP systems that may have been too expensive or technically unsupportable may become doable using MPLS because the networking standard offers lower latency, increased bandwidth and the ability to prioritize traffic.

Upgrading Connectivity VPN Technology Adoption Rates

Multiprotocol Label Switching (MPLS)



Secure Socket Layer



SOURCE: Forrester Research

How to Manage Innovation

A great idea is only as successful as the team that executes it

BOOK REVIEW Like other media genres, business books are subject to fads. Thus, the proliferation of titles concerning innovation—how to generate it, manage it and make money from it. The final step

depends on the successful execution of the first two. And yet, argue Curtis

needs, creating business value, championing innovative ideas, building and maintaining innovation teams and aligning innovation with the organization. The authors' methodology comes from years of experience with research institute SRI International, known for pioneering the computer mouse, HDTV and robotic

surgery. (Carlson is SRI's CEO. Wilmot helped create SRI's Disciplines of Innovation workshop for executives, which teaches the approach.)

R. Carlson and William W. Wilmot in *Innovation: The Five Disciplines for Creating What Customers Want*, many great ideas wither for lack of a coherent value proposition, or they are torpedoed by fear. The authors share their approach for how to navigate these obstacles.

Carlson and Wilmot's "five disciplines" encompass identifying important market



Innovation: The Five Disciplines for Creating What Customers Want

Curtis R. Carlson & William W. Wilmot
Crown Business, 2006, \$27.50

Each chapter spotlights one aspect of the innovation process using detailed examples, such as how SRI pulled together its HDTV prototype team—and kept it together through grueling work. Refreshingly, the book also acknowledges failure: One "brilliant inventor" who got \$6 million to develop an insulin patch for diabetics, was fired when he refused to collaborate and kept asking for raises.

Everyone knows that infighting can kill a great idea. The broader lesson of this book: Successful innovation is almost always hard, requiring dedicated leadership, a well-defined (and well-understood) project vision and a willingness to tackle problems quickly.

(For more about how companies execute innovation, turn to our coverage of this year's CIO 100 honorees, beginning on Page 44.) —Elana Varon



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ESSENTIAL

FROM INCEPTION TO IMPLEMENTATION—I.T. THAT MATTERS

technology



Game-changing technologies are a part of IT life. It's up to you to run with them—or get run over.

Disruption? Ride With It

BY DAVID STROM

HOT TECHNOLOGY | New technologies can change the relationship of supplier and customer. New applications can create huge infrastructure implications. And sometimes the best way to learn how to cope with these changes is to face them squarely. To give you early warning, we queried various experts and found five technologies that have the significant potential to transform the way your IT department does business in the coming years.

Disruption 1: **Multicore Processors**

Leading vendors: AMD, Azul, Intel, Sun

Old thinking: One processor in every box

IT impact: New numbers in the “performance, power and cooling” equation

New computing platforms from Intel and AMD have arrived with reduced power requirements that take price and performance to new levels. On the plus side, the newer processors are more energy-efficient and can deliver more raw horsepower per watt of power, so IT departments concerned with their energy bills will be motivated to replace their older servers.

But even the most energy-efficient designs are still an issue for data centers that were constructed long ago on mainframe layouts. The trouble is that these spaces aren't able to withstand the intense heat generated by racks of densely stacked distributed processors that generate more heat per square foot when stacked in large columns than the mainframes ever did. This may mean wholesale design changes on the data center floor. "For every watt of server power consumption, we pay twice—first for powering the server and second for the air-conditioning that cools it down," says Rene Wienholtz, CTO of German Web hosting provider Strato.

Disruption 2: **Server Consolidation and Virtualization**

Leading vendors: EMC/VMware, Liquid Computing, Microsoft, Sun

Old thinking: PCs running a single OS

IT impact: Quicker software development and rapid application deployment, cutting costs and better leveraging server hardware

The concept behind virtual machines (VMs) is simple to state but hard to implement: Take a single server and divvy it into separate "virtual" machines with their own software-built memory, virtual hardware, drive images and other resources. Virtualization isn't new: IBM has been doing this on its mainframes for close to 30 years. What is new is that the power of virtual machines can be effectively delivered to the PC platform. And fierce competition in this space is forcing the major players literally to give away pieces of their VM server software.

Why the hot market? For IT, virtualization lets multiple operating systems and applications run on the same box, making it easier to provision new servers as necessary and make more efficient use of hardware. This continues the consolidation trend that began several years ago with blade servers: Think of virtualization as the ultimate result, where many individual servers can now run on the same piece of

hardware rather than on individual blades. You save space, you save time, you simplify your IT support structure, and you save plenty of money reusing the same gear.

But there is more to VM than server consolidation. EMC, for instance, has already established some prebuilt virtual machine appliances that come with ready-made applications such as Web, e-mail and database servers that IT can install and have running in minutes—further reducing the time to build out new servers. "We

Virtualization isn't new: IBM has been doing this on its mainframes for close to 30 years. What is new is that the power of virtual machines can be effectively delivered to the PC platform.

plan to use virtual server management to reduce our server support efforts, minimize downtime and reduce the ongoing costs of server replacement, enabling us to support more hardware with existing staff," says Karen Green, CIO of Brooks Health System.

"Two years ago, it wouldn't have been possible to handle [such a heavy] workload in a data center. Now we can, thanks to this new virtualization software," says Wienholtz.

Disruption 3: **RFID**

Leading vendors: Reva Systems, ScanSource, Symbol

Old thinking: Automating the production line was all about making cheaper finished goods

IT impact: Dramatic changes in the supply chain and ERP systems will let companies keep closer tabs on inventory and production

Trading information between suppliers and distributors will never be the same thanks to the maturation of radio fre-

quency identification (RFID). While the technology is a decade old, new developments in the integration of supply chain infrastructure, more solid standards, and products such as Reva Systems' tag acquisition processor have made it easier to integrate RFID data directly into inventory, supply chain and manufacturing systems. Tagged merchandise can be tracked as it leaves finished-goods inventory, travels across state lines, arrives at the loading dock door and gets purchased by a retail

consumer—with each step along the way providing real-time information to various systems. And with Wal-Mart and the U.S. Department of Defense making RFID information exchange mandatory for many suppliers, tens of thousands of vendors are implementing RFID to track everything from pill bottles to palettes to people. RFID enables all sorts of applications such as alarms that sound when items are shoplifted, payment systems that don't require a credit card swipe and automatic employee-access controls surrounding specific sensitive locations.

Older RFID applications were built to locate a particular palette or track a shipment. Tomorrow's applications will enable product line managers to track where all of their goods are in the production and delivery process in near-real-time, letting them closely observe any bottlenecks or supply problems.

The consequences of RFID are huge, especially the infrastructure implications. "RFID computerizes the edges of the enterprise," says Marlo Brooke, senior partner



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at systems integrator Avatar Partners. This means that companies will need to upgrade networking infrastructure—both wired and wireless—as RFID readers are deployed across the enterprise.

Disruption 4: **Software as a Service**

Leading vendors: Amazon, Google and thousands more you've never heard of

Old thinking: Build your apps one at a time from the ground up

IT impact: Mix and match your browser-based applications to create cheap custom tools

The Web has become a solid application delivery platform, transforming the way we can deploy enterprise software. Call it

CIOs can order a combination of small-scoped applications that are more appropriate to particular situations yet work well together. Take one part hosted e-mail server, mix in another part Java servlet to process a series of forms, then add an online storage repository from Amazon called by another Web application to configure automated backups and to run batch jobs. All of these can connect to each other via the Internet and may not even reside on your company's servers.

The hard part with all this "Web 2.0" talk is understanding how to take apart your particular application into discrete pieces that someone else has already written. To adapt, IT managers must think in layers, just like the Internet is designed with different protocols that distinguish between

With software as a service, savvy CIOs can order a combination of small-scoped applications that are more appropriate to particular situations, yet work well together.

a mashup, Web service, software as a service or service-oriented architecture—it all amounts to the same thing: becoming more flexible and nimble while saving a boatload of money by not having to write code from the ground up for each application.

By using these techniques, says management consultant Rod Boothby, "We are on the verge of experiencing a jump in the capabilities of office tools that is just as significant as the jump that occurred when the first PCs landed on people's desks." Instead of picking application partners that have the best prices or series of features, savvy

lower-level transportation and higher-level applications. According to Doug Neal, a research fellow with the Computer Sciences Corp. Leading-Edge Forum Executive Program, "We finally have a layered series of services that can meet changing [business] requirements. You can pick the right layers to match your needs."

Disruption 5: **Endpoint Security**

Leading vendors: Cisco, ConSentry, Lockdown Networks

Old thinking: Security point solutions from multiple vendors

IT impact: Protect your laptops and defend your entire network by thinking in broader strokes

Our last trend is a real challenge: delivering consolidated endpoint security across

By 2008, the majority of Global 1000 companies will quickly adopt several technology-related aspects of Web 2.0 but will be **slow** to adopt the aspects of **Web 2.0** that have a **social dimension**, and the result will be a **slow impact on business**.

SOURCE: Gartner

the enterprise. You buy single-purpose products that do one or two things well, such as antivirus, firewall, intrusion prevention, policy enforcement, authentication and the like. Trouble is, there is no single product that delivers a complete solution. Meanwhile roaming laptops are coming into your network and spreading infections daily.

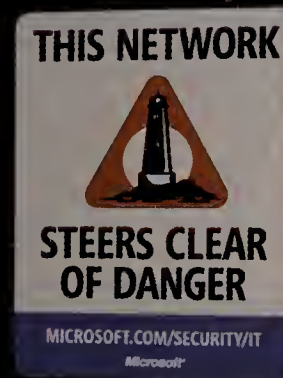
Picking among the three current major architectural efforts for endpoint security will consume a good part of your budget and time. Cisco and Microsoft have their own takes on the issue, and an open-standards group called Trusted Computing Group is behind door number three. Cisco focuses more on securing network infrastructure, Microsoft more on desktop remediation, and Trusted Computing Group starts with low-level hardware protection. Before you get behind any approach, take the time to research the differences and decided which vendors implement the pieces of the endpoint puzzle most critical to your business. Right now, no single approach covers all the security bases. **CIO**

David Strom (david@strom.com) is a freelance writer who has written books on e-mail and home networking.

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Show Them the Money

It's time to position your IT organization as a profit center. Here's how.



For years now, we CIOs have been hard at work consolidating data centers, systems and software licenses. We've saved our companies millions. But as the saying goes, "You can't save your way to greatness." Greatness in business requires making money.

And so we need to change our thinking about what IT contributes to an organization. We're used to viewing computing as a back-office function—a cost center. But we have to turn it into a profit center. We need to ask ourselves what we can do with IT that our customers will pay for.

CIOs must exercise leadership here because IT is becoming central to how companies make money in our global economy. While important for all CIOs, it's essential for CIOs at mid-market companies, where survival depends on finding new revenue opportunities.

Think Like a Salesperson

Using IT to make money means getting close to your sales force and helping them sell more of your company's products. It's that simple. But it takes commitment to shift from a money-saving to a moneymaking frame of mind.

The first thing to do is delegate cost cutting to some of those very competent people who report to you. Lay out any remaining money-saving plans you may have, encourage your team to develop their own ideas and let them run. Stay informed, but leave the day-to-day decision making to them. Now you have cleared your desk and you can focus on making money.

Next, get to know your company's salespeople, the products and services they sell, and the customers who buy these products. Go on sales calls. Take note of how the salespeople



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talk about products and the questions that customers ask. Concentrate on what customers like and don't like about your products. Find out what your competitors are doing. How do their products and prices compare with yours?

Now ask yourself, what will make the products your company sells more attractive? How can IT improve the things customers like and eliminate those that they don't like? As you ponder these questions, remember that all products have two components. The first component is the basic product or service itself. The second component is the information that surrounds the product. This information is what enables customers to search for and select your product, understand how to use it, and get the results and benefits they want from it.

Most products quickly become commodities because your competitors have similar products, and the prices you can charge for them get ratcheted down. This makes the information component more valuable. Through creative use of the information component, you can wrap any commodity product with a mix of value-added services that make it more useful, and for which customers will pay. Let's say your company sells electrical wire to building contractors. You can increase the value of the wire by collecting information about the builders' needs. You can use this information to offer wire pre-cut into the lengths customers require, to splice specified plug connectors onto each end and to deliver the wire to job sites right when it is needed. Your company can charge builders extra for these services.

Because value-added services are information based, the CIO is a key enabler of them. CIOs are best equipped to design ways to collect information about customer needs. And CIOs understand best how to present this information to the people in their companies who deliver new services to customers.

The Value-Added Paper Cup

For the past six years I was the CIO of Network Services, a mid-market distributor of food-service disposables and janitorial supplies for restaurant chains, property managers and grocery stores. We're talking paper cups, plastic forks, paper towels and floor wax. A paper cup is a commodity product if there ever was one. What do you suppose is the profit margin on a paper cup? The answer is "not much," and it gets lower every year. So the challenge was to use IT to make those paper cups more valu-

able. (Network Services is honored with a 2006 CIO 100 Award. To learn about how other CIO 100 honorees used IT to generate revenue, turn to "Money (That's

What They Want)," Page 50.)

Here's how we did it. In collaboration with the company's sales, customer service and finance organizations, we devised a menu of value-added services that salespeople could mix and match to meet specific customer needs.

We made it very easy and convenient for customers to find and order our cups by providing an online product catalog that let them search on many different product parameters. We also set up the catalog to remind them to order other items that normally go along with cups, like lids and sleeves.

We let customers place and track their orders online so they could know when their supplies would be delivered. We also created customized labels so that when cups were delivered, customers could quickly receive, store and retrieve them.

We enhanced our billing system to streamline the processing of invoices by customers and reduce their costs of

Using IT to make money means getting close to your sales force and helping them sell more of your company's products. It's that simple.

doing business with us. We sent invoices in whatever format customers wanted so they could automatically import them into their accounts payable systems. We even preprocessed invoices, inserting customers' general ledger codes into every line item on invoices so those costs could be automatically disbursed to their general ledger systems.

Finally, we provided customers with easy-to-use Web-based reporting that lets them see how many cups they ordered at each of their ordering locations over any period of time from one day to two years. They could monitor their spending and get detailed data for planning and budgeting, along with real-time insight into usage patterns and purchasing trends.

In short, we turned our products into tailored solutions that solved important problems for our customers. And therefore, we could sell our paper cups for a few percentage points more than our competitors.

Every company has its equivalent of the paper cup. Figure out how you can leverage the information about the products your company sells, and how you can use IT to deliver a customized mix of services that enhances those products, and you will earn the right to call your IT organization a profit center. You can take that straight to the bottom line. **CIO**

Mike Hugos is the former CIO of Network Services and the author of two books, *Building the Real-Time Enterprise* and *Essentials of Supply Chain Management*. He can be reached at www.michaelhugos.com. Send your comments to leadership@cio.com.



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Mike Hugos writes about **LEADING I.T.** in his blog, *Doing Business in Real-Time*. Find it online at blogs.cio.com. Listen to an interview with Hugos at www.cio.com/podcasts/ciotogo.

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The Right Question

If perception helps define reality, then asking your customers how they perceive IT innovation is a simple and inexpensive way to focus your efforts



If you really want to know how innovative your IT shop is, don't bother benchmarking your competition or retaining consultants: Just ask your colleagues and customers. The question is simple. The answers will surprise you.

"What's the most innovative thing you think IT is doing for you?" Just ask. It's not expensive. The best reason for asking: You'll quickly learn how critical stakeholders see—and don't see—your IT organization's innovation "brand." You'll also gain quick insight into how they define innovation—or if they even care about it at all. A shrug of the shoulders matched by a glazed look of annoyance is not uncommon. Hopefully, that's not how your CEO or CFO reacts.

Then again, they may not care as much about innovation as you do.

Because IT wants to be customer-centric and future-focused, we're often too quick to ask, "What do you want IT to do for you?" That's not a bad question, but it's one that's sure to set false expectations. CIOs had first better grasp where internal perceptions *are* rather than selling where they'd like them to be. Getting to where you want to go depends on it.

Too many employees, for example, don't associate IT with genuine business innovation. They think of technical upgrades and enhancements. That perception effectively brands internal IT innovation as "geeky" and "techy." That's bad brand positioning for a CIO who wants to help an enterprise grow.

It's not surprising that different parts of the enterprise define innovation differently than does IT. The surprise—and disappointment—comes from hearing so many of your peers and their subordinates define IT innovation initiatives in ways

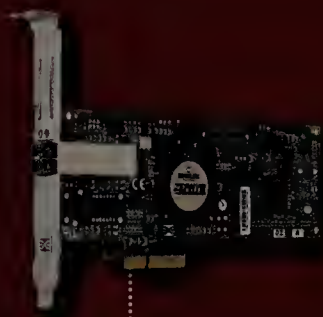
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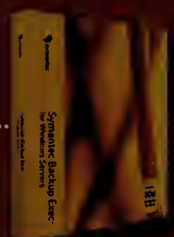
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that make what you're doing seem incidental, inconsequential or taken-for-granted. CIOs need to hear those answers. I have heard responses ranging from "the most innovative thing IT does for us has been cutting our downtime in half" to "runs the website" to "implemented a CRM we actually use" to bursts of cynical laughter. Are you confident you know how that question will be answered both inside your organization and out?

Why Users Know Best

The simple beauty of simple questions is that they frequently yield simple insights that matter. One Fortune 100 CIO who casually but consistently asked employees to name the most innovative thing IT was doing was consistently referred to the help desk. He discovered that, in addition to answering technical questions, this help desk had made a follow-up practice of e-mailing URLs of sites that would further explain to users how to get more value from their machines.

That simple—and cheap—innovation prompted the CIO to partner IT with HR. They set up a pilot program to send targeted URLs to employees with questions and concerns about health care, educational programs and personal-day policies, and it tested well. The CIO cleverly leveraged an existing internal perception of an innovative IT practice to make his organization more visible and more valuable.

This approach can lead to revenue-generating ideas as well. For example, an airline CIO learned that his online customers thought the most innovative thing the airline did on its website was the seat selector map. That got the CIO thinking whether the site should offer people the opportunity to pay more to get "better" seats. That's an easy Internet experiment to run: Would individuals pay an extra \$15 or \$20 for an aisle or exit row seat on a four-hour flight? Like the e-mailed URLs, this idea cleverly played into what IT was already seen as doing innovatively and successfully.

How to Build the Innovation Brand

CIOs can better build IT's innovation brand by explicitly linking it to their customers' perceptions of innovation. You build your innovation brand not by doing things *you* think are more innovative but by doing those things your customers and colleagues find more innovative. How will you know this? Because they'll both tell you and show you. They'll effectively explain how e-mailed URLs and seat maps can become innovation springboards for IT.

The hard problems materialize when IT's internal and external clients can't answer the simple question. They don't know, don't care or simply take for granted what IT does for them. Even worse, they understand the question perfectly but

genuinely believe that IT is not an innovation partner or supplier. What should CIOs do then?

The best answer is, "Take ownership." In the spirit of turning a bug into a feature, I've seen CIOs successfully exploit the total absence of their shop's innovation brand by personally going out to the business units to learn how they defined innovation. The CIOs, out of their own budgets, had a SWAT team of trusted lieutenants present IT-enabled innovation ideas to

There is no way that IT can become an innovation leader unless it learns how its internal and external customers define what's innovative.

key business units, then ask them what seemed like valuable innovations to them. These CIOs were savvy enough to recognize that "supporting the business" was no longer enough; IT's role in "supporting the business's innovation agenda" also had to be explicit.

Bring IT Innovation to the Business

Of course, CIOs can also boost IT's innovation brand by successfully exporting their own innovations. At one Fortune 200 company, the CIO informally asked his people what they thought was the most innovative thing IT was doing. To a person, they declared that their extreme/agile programming effort was an innovation initiative they really liked. This CIO immediately had a couple of his lieutenants scout for XP project opportunities in business units that wanted a new, more agile way of working with IT. The methodology became a platform for collaborative innovation.

There is no way a CIO can be an innovation leader without a real grasp of how IT's innovation brand is perceived. More importantly, there is no way that IT can successfully become an innovation leader unless it learns how its internal and external customers define what's innovative. While there are many detailed, comprehensive and expensive ways to determine these things, simple questions sincerely asked offer a lot of bang for the buck.

Instead of asking, "Are we doing a good job for you?" or "Do you think you're getting a good value for your time and money?" CIOs need to ask the business users a few simple questions about what IT does for them when they try to innovate. While perception surely isn't reality, it's where reality starts. It's where innovation begins too. **CIO**

Michael Schrage is codirector of the MIT Media Lab's eMarkets Initiative. He can be reached at schrage@media.mit.edu.





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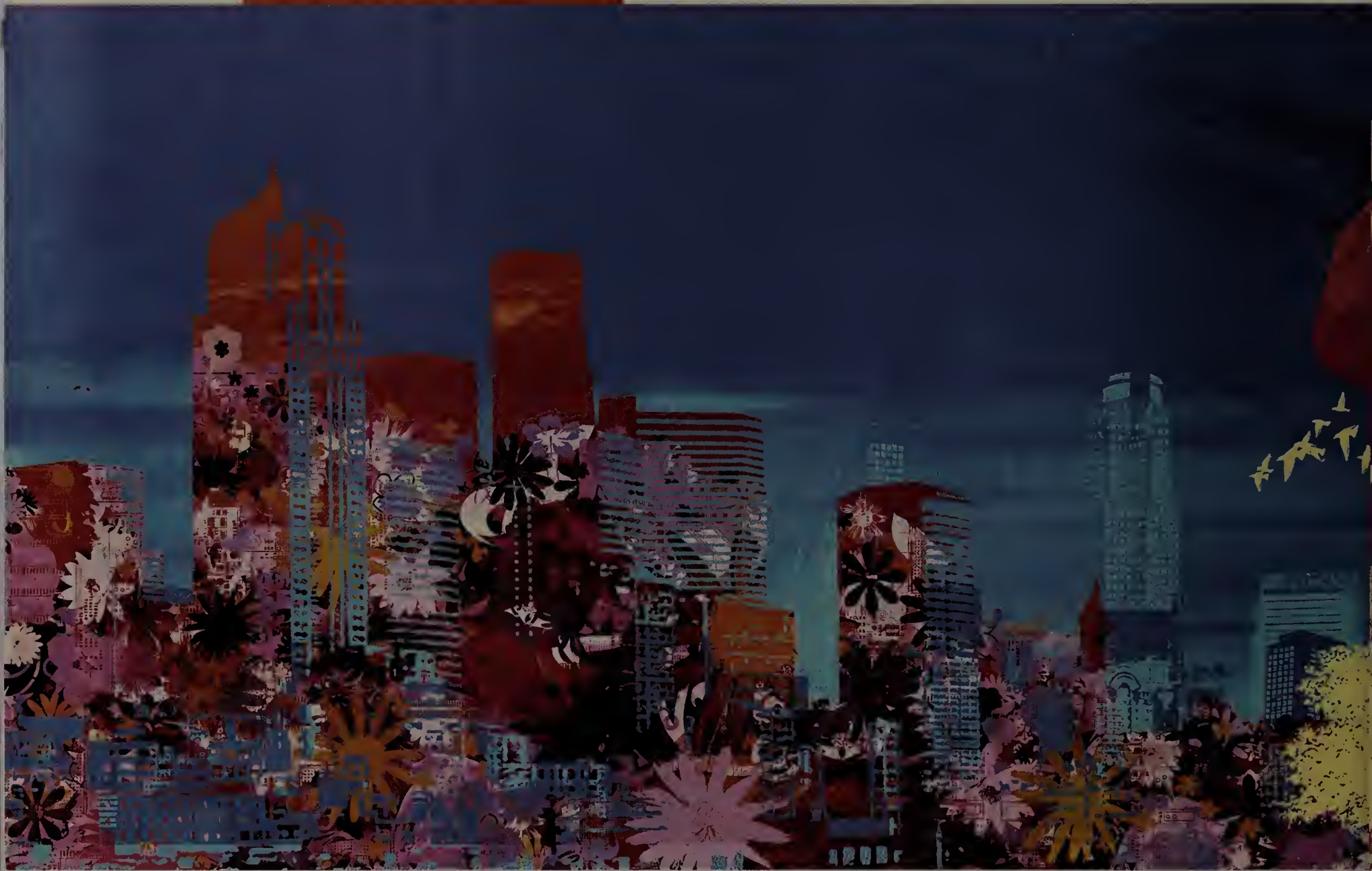
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CIO 100 **Innovation** **For Growth**

BY ELANA VARON

You can't win standing still.
Our 100 honored companies prove
that creative investment in IT is
key to marketplace success.



After years of asking IT to focus laser-like

on cutting costs, reducing operating expenses and (for a change) cutting some more costs, the enterprise has finally embraced the idea that IT should be driving innovation. Experimentation has been sanctioned at the highest levels. To grow, companies are now willing to assume a measure of risk, and CIOs are thinking not merely about how technology can help their companies survive (while, heaven forbid, not adding overhead) but they are working to gain competitive advantage by actually doing something new.

That's the message we've received from the diverse group of organizations that compose the 2006 CIO 100. Whether they were at a small nonprofit like MediSend International (which used supply chain management technology to reinvent its business model for distributing humanitarian aid) or a \$20 billion behemoth like Goodyear (which used supercomputers to model new tires), CIOs this year creatively used IT to advance their companies' strategic goals. And these companies did not simply deploy the latest technology. What sets our honorees apart is how they used IT in new ways to generate business value, whether by creating new products and services, developing better ways to serve customers or tackling operational challenges.

Two-thirds of the CIOs among this year's honorees report that their IT budgets are bigger than they were two years ago, according to our annual CIO 100 survey. (For all the survey data, go to www.cio.com/cio100.) On average, the honorees are spending

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38 percent of their budgets on new projects, and more than three-fourths said their companies were willing to assume at least a little bit of risk in the process.

It Takes IT to Make Money

Since time immemorial (or at least since the dotcom bubble burst), IT departments continually have been challenged to demonstrate the value of technology investments. For years, CIOs found that value in IT's ability to cut costs. Now, as Senior Editor Stephanie Overby writes in "Money (That's What They Want)," Page 50, smart CIOs are dedicating a portion of their IT portfolios to projects that make money. For instance, credit card purveyor Discover Financial Services is integrating its payment network with that of China UnionPay—China's only credit card provider—thereby giving Discover cards a competitive advantage in China over its larger American rivals, Visa, MasterCard and American Express. The result is that Discover's card is now more widely accepted in China than its competitors'.

Even nonprofits have gotten into the act. Ball State University deployed a wireless network for its campus and the surrounding neighborhood and then turned it into a profit center by marketing it as a testbed to telecom companies and government agencies. The university has inked agreements with wireless technology vendors and the federal government worth up to \$1 million annually.

Making money demands a different mindset than cost cutting—and a different set of business processes. Instead of thinking of ways to do the same thing in a better (faster, less expensive) way, CIOs who intend to make money are assigning their most creative staffers to get inside external customers' heads to learn what products and services they want.

It stands to reason then that, according to our survey, the three most important ingredients for an innovative business culture are leadership, creative people, and good business-IT alignment. In "Imagination at Work," Page 65, Senior Writer Meridith Levinson describes five projects that succeeded because technology and business leaders made it easy for talented employees to pursue ideas that, though unconventional, held potential for a big payoff.

THE CIO 100 By the Numbers

Winning Technologies

Handhelds, Web services and wireless dominate our honorees' IT investment plans.

HARDWARE

Handhelds/PDAs	54%
Laptops/Notebooks	32%
Mainframe/ Midrange computers	20%
RFID	18%
Other	14%

INTERNET/TELECOMMUNICATIONS

Wireless	53%
Videoconferencing/ Webcasting	27%
Search tools	26%
E-commerce tools	17%
Other	4%

OPERATING SYSTEMS/APPLICATIONS

Web services	56%
Business intelligence/ Data mining	43%
Enterprise portals	32%
CRM	31%
Database management	31%
Linux	28%
Knowledge management	27%
Imaging/ Document management	27%
Enterprise application integration	26%
ERP	21%
Supply chain management	16%
Hosted software	12%
Marketing/ Sales automation	9%
Other	7%

Respondents chose up to three items.

Where Ideas Come From

Business unit leaders are most often the wellspring for innovative initiatives. CFOs rank last.

SOURCES

Business unit or function leaders	60%
Ad hoc task forces	51%
CIO	43%
IT staff	37%
CEO	27%
Business staff	17%
R&D group	13%
External customers or suppliers	10%
Other	9%
COO	8%
Board of directors	4%
Vendor partners	4%
CFO	3%

Respondents chose their top three.

Business Goals

Efficiency and increased productivity are top targets of winning initiatives.

GOAL

Efficiency/Increased productivity	85%
Competitive advantage	63%
Customer satisfaction	59%
Business innovation	58%
Generate revenue	38%
Improve global operations	18%
Improve supply chain	16%
Regulatory compliance	14%
Other	13%
Business continuity	11%
Security/Privacy	5%

Respondents chose all that applied.

Spending on New IT

Winners spend an average of **38%** of their IT budgets on new projects; **62%** goes to operations and maintenance.

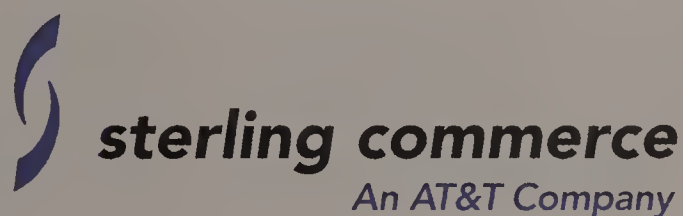
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BUSINESS APPLICATIONS / BUSINESS INTEGRATION / BUSINESS INTELLIGENCE / BUSINESS PROCESS MANAGEMENT / SOLUTION DELIVERY



SOA Governance

IT-enabled innovation requires a flexible infrastructure—one that many honorees are achieving through their deployment of a service-oriented architecture (SOA). According to the CIO 100 survey, 56 percent of honoree companies said they plan to implement or leverage Web services during the next year.

Galen Gruman writes in “Services In Sync,” Page 74, that establishing policies for the development of business services is essential to achieving SOA’s promise of increased agility and better business processes.

A good SOA governance process includes policies for making decisions about which services to develop, how they will be tracked (so developers can reuse them) and how data will be shared by users. For example, honoree ING Group established an architecture team to determine which business processes are the best candidates for services, using the guiding principle that these processes be common across the company.

Another honoree, Hygeia, uses wikis to track its services. The wiki technology—which allows multiple users to edit content on a website—is a simple solution that works for the company’s 14-member IT department and small number of services. Hygeia CIO Rod Hamilton says, however, that he’ll need to build a repository to catalog services as the number of them grows.

Dealing with Disruption

Although many discussions of innovation focus on the creation of new commercial opportunities, this year’s CIO 100 honorees demonstrate that it also depends upon connecting the top line with the back office. Eighty-five percent of CIOs reported efficiency and productivity were the top business goals for their winning projects.

To that end, more than a third of this year’s honorees have developed pioneering

The CIO 100 Online

For additional coverage of the **2006 CIO 100**, including a searchable database of this year’s honorees, podcasts and downloads relating to topics covered in this issue, visit www.cio.com/cio100.

CIO.COM

How We Chose the CIO 100

Beginning in mid-January, we solicited applications for the 2006 CIO 100 Awards through ads in *CIO* and our online newsletters, as well as electronic mailings to our print subscribers and to publicists who sign up to receive our editorial announcements. Entrants filled out an online application between mid-January and the end of February, providing us with more than 400 submissions. Although most applications came from companies headquartered in North America, the pool included entries from five continents.

Each application was read by two *CIO* writers and editors who evaluated them according to four criteria: innovation, business value, leadership and collaboration with end users or external partners. Applications that received a score of 26 or higher (out of a possible 40) were selected for a second round of scrutiny. We examined how each company stacked up against the others in the pool, putting emphasis on submissions that told the best stories about generating business value through creative and cutting-edge uses of technology. Unlike in years past, we did not look for projects that hewed to a specific theme; instead, we sought to cull the most exciting initiatives in the mix for the CIO 100 honor.

The companies we selected for this year’s CIO 100 Awards range from private organizations with a few million in revenue to multibillion-dollar global powerhouses, and they span every industry. To be selected, companies had to demonstrate not only that they were able to create new value using IT and execute their project well but also that they did so in uncommon, innovative ways: pioneering a new technology, applying a familiar technology to a new purpose, setting the bar higher for their competitors. In short, these companies are technology leaders. —E.V.

wireless applications to deliver new tools to workers and managers. As Senior Writer Thomas Wailgum writes in “Untethered (But Not Disconnected),” Page 80, wireless devices introduce innovative ways of working, but these are disruptive even when welcome. And they often aren’t. Our honorees have learned that managing change requires careful planning—beginning when new tools and work processes are just a glimmer in a developer’s eye.

At Capital One Financial, employees struggled with the company’s bureaucracy. It sometimes took two weeks to schedule even a short meeting. Nevertheless, not everyone was convinced that a radical revamp of the company’s office space—tearing down cubicles and deploying wireless networks—was the answer. But CIO Gregor Bailar was, and he sold the concept in part by moving out of his own office to a table in full view of his staff—and handing out wireless cards to anyone who wanted to give the new technology a try.

There are even more ideas for generating value through innovation in this issue’s Trendlines section (beginning on Page 23) and from our columnists. Find out how Case Western Reserve University helped wire Cleveland with fiber-optic broadband services (Page 23), and read a review of a new book on bringing innovations to market (Page 29). On Page 36, Total Leadership columnist Mike Hugos, former CIO with honoree Network Services, writes about how he developed the mind-set for making money with IT. And on Page 40, Michael Schrage advises CIOs to let what end users perceive to be their IT departments’ most innovative accomplishments guide future development.

The 2006 CIO 100 know that innovation is not an end in itself, but that creative ideas, harnessed to business needs, are the key to their corporate future. **CIO**

Executive Editor Elana Varon coordinated this year’s CIO 100 Awards and this issue. She can be reached at evaron@cio.com.

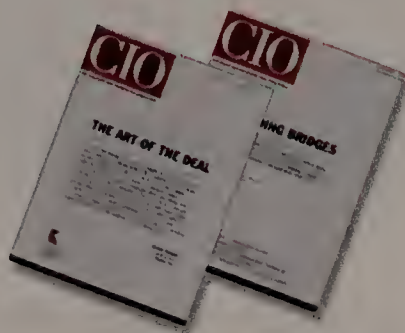
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Revenue Generation

IN THIS STORY

- * BALL STATE UNIVERSITY
- * DISCOVER FINANCIAL SERVICES
- * FOLEY & LARDNER
- * YRC WORLDWIDE

Money

(That's What They Want)

BY STEPHANIE OVERBY

After years of focusing on the bottom line, CIOs are setting their sights on top-line growth

Money was very much on the mind

of Dr. O'Neal Smitherman as he tested and implemented a bleeding-edge broadband wireless network for Ball State University and the surrounding community in 2004. University president Jo Anne Gora had just challenged administrators and educators to develop new business opportunities that could generate much-needed revenue. The VP for information technology knew his organization was as capable of contributing moneymaking ideas to support the university's core business—developing and distributing knowledge—as any

other academic or administrative department. And the wireless project had real revenue potential.

Smitherman had secured \$850,000 in federal funding and an additional \$500,000 in donations to test the educational and social value of delivering high-bandwidth wire-

less technology to local elementary schools, surrounding homes and Ball State itself. "We were learning things that everyone else in need of wireless solutions had been struggling with and would want to know," he says. "We were discovering the answers and realized we could generate revenue by providing them [to others] for a fee."

TOP-LINE TIPS

- * Can't afford an R&D group? Make innovative thinking everyone's job to inspire leading-edge work.
- * Keep core customers happy. Test a new technology and its revenue-generating potential but spread its benefit to as many constituencies as possible.



The Digital Middletown Project, as the wireless initiative was called, won the respect of telecommunications companies who now view the university as an essential resource for developing and testing long-distance wireless technologies. It also earned Ball State a 2006 CIO 100 Award. Its most impressive achievement, however, is the \$500,000 to \$1 million in annual revenue generated by the Office of Wireless Research and Mapping, the business IT spun off the wireless project. Smitherman expects that revenue stream to grow 10 percent each year. "As state-level support declines and the cost of providing education increases, universities are looking for alternative ways of supporting themselves," he says. "The general perception has been that IT is a cost rather than an opportunity to generate revenue. We're changing that perception."

Smitherman is not alone. Smart CIOs are reclaiming their roles as revenue enablers (which diminished during the cost-cutting years) either on their own or in response to renewed interest from the top. "IT is playing a more central role in revenue generation,"

STEAL THIS IDEA

Stash That Cash

Ball State CIO O'Neal Smitherman (above) used government funds to fuel a broadband wireless project that now brings in up to \$1 million in annual revenue. He banks 10 percent to 15 percent of the proceeds in an "innovation fund" for new revenue-generating projects.

says Jeanne Ross, principal research scientist at Center for Information Systems Research (CISR), who's studying the IT organization of the future. "It's partly because there may not be a lot more costs to cut, and the efficiency gains left to be made are marginal."

And during their cost-cutting days, she notes, many CIOs "got sophisticated in their knowledge of IT-enabled business process and have put themselves in a better position to enable new ways of doing things."

It's not just happening in industries where technology is the business, like financial services or software. CIO 100 honorees contributing to the top line range from law firms to universities to trucking companies. "The Holy Grail of IT is, 'How do we become better business partners? How do we get a seat at the table?'" says Michael Rapken, CIO of YRC Worldwide, another CIO 100 honoree.

YRC focused on seeking M&A efficiencies over the past few years but is increasing IT's involvement in making money again. "If we in the technology group don't have a focus on cultivating new business opportunities and revenue," says Rapken, "we're nothing more than a cost clog."

IT is uniquely situated to help the business identify and generate new revenue opportunities. For one thing, says Laurie Orlov, VP and research director at Forrester, "there aren't too many revenue-generating ideas left in the world that aren't dependent on technology." In addition, IT is the gatekeeper of data across the enterprise and understands business processes intimately after years of streamlining.

Introducing revenue generation into IT's portfolio of responsibilities has its



A robust R&D group keeps IT well-positioned for new revenue opportunities, says Discover CIO **Diane Offereins**.

challenges. Years of emphasizing consolidation and standards to keep costs low have created a rigid IT environment that's resistant to change and unfriendly to the needs of new business opportunities. IT also tends to be removed from the end customer, from whence all new revenue generates. Finally, many technology organizations are stretched too thin to invest in revenue-generating projects that may—or may not—work out.

But CIOs who want to contribute to the top line should take a page from our CIO 100 honorees, who are putting in new processes or reviving dormant ones to support this

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revenue-generating renaissance: harnessing the creativity that exists in IT, engaging with the end customer, ramping up for high-speed projects and letting go of some rules to take a chance on revenue-generating opportunities.

Harnessing IT Creativity

After 2001, every IT cost was under attack, even R&D. Casualties included the best minds in the department. "I met one CIO who basically got rid of all those people who were creative and helpful," says Orlov. "IT R&D departments typically only remain in the most partner-player IT organizations, where IT is tightly integrated with customer strategy. A lot of that emerging technology research within IT went away." But new technology can be the key to competitive advantage, and therefore, revenue growth.

At YRC Worldwide, however, there's a growing emphasis on IT R&D. When CIO Rapken joined the Overland Park, Kan., company last year, he doubled the size of its R&D group. The group watches trends and conducts trials on everything from GPS to RFID to determine which hold the most promise for the trucking business. "I didn't feel we had enough people to keep up with the ideas that the business wanted help evaluating," Rapken explains. "By

investing more resources we'll get a greater return on innovation. When people see this, they believe you are serious and are more willing to contribute ideas."

That's a big step, says Orlov. "You have to create an idea-generating framework and a good process to go with it to make sure great ideas for generating revenue are acknowledged and incented and sponsored at the top," she says. "There are creative people and good ideas in IT. You just have to figure out how to tap them."

By reintroducing R&D, YRC's IT projects are now weighted about 70 percent toward cutting costs as the company digests recent acquisitions and 30 percent toward enabling revenue growth. Getting projects in the latter category funded can sometimes be a challenge. "It's difficult to create a business case for some projects because they're scrutinized by finance people who want tangible benefits," Rapken explains. "It's easier to quantify that on the cost-cutting side."

One strategy for success is to make the \$8.7 billion company and its systems easier to do business with, says Rapken. This not only tends to increase revenue but provides the cost-cutting benefit as well. "By improving processes, you make yourselves more attractive to customers and grow revenue," says George Westerman, a research scientist at CISR.

YRC's CIO 100 Award was for such an initiative: a Web-based customer service system in its Roadway Express division. The customer service department comprised three separate groups. They all used the same system but each worked with its own set of screens and programs. Between them they used more than 60 screens, many with identical functions. IT realized the department could be more productive if the screens were streamlined into a single browser-based system that eliminated duplication and was more user-friendly. Indeed, after spending \$1.8 million on the corporate sales center application, the company's call center reps were able to increase outbound calls, cross-sell other YRC services and close more sales. Roadway Express revenue shot up an average of 20 percent over a two-year period in five product areas.

What if you don't have the luxury of a separate R&D group? Make creative thinking part of everyone's job, says Ball State's Smitherman. "Looking for innovation is a key day-to-day task," he says.

Smitherman also relies on the draw of leading-edge work—such as the wireless initiative—to inspire active participation by staff. "IT stepped up and they did this as

Decision Drivers, Execution Tips

Getting started, then delivering on innovation

What Works

Collaboration is the key to bringing innovation to fruition

DEVELOPMENT TECHNIQUE

Cross-functional innovation teams	57%
Close relationships with customers	52%
In-house IT development	34%
Rapid prototyping	33%
Strong partnerships with vendors and/or outsourcers	32%

Respondents chose their top three.

When the Light Turns Green

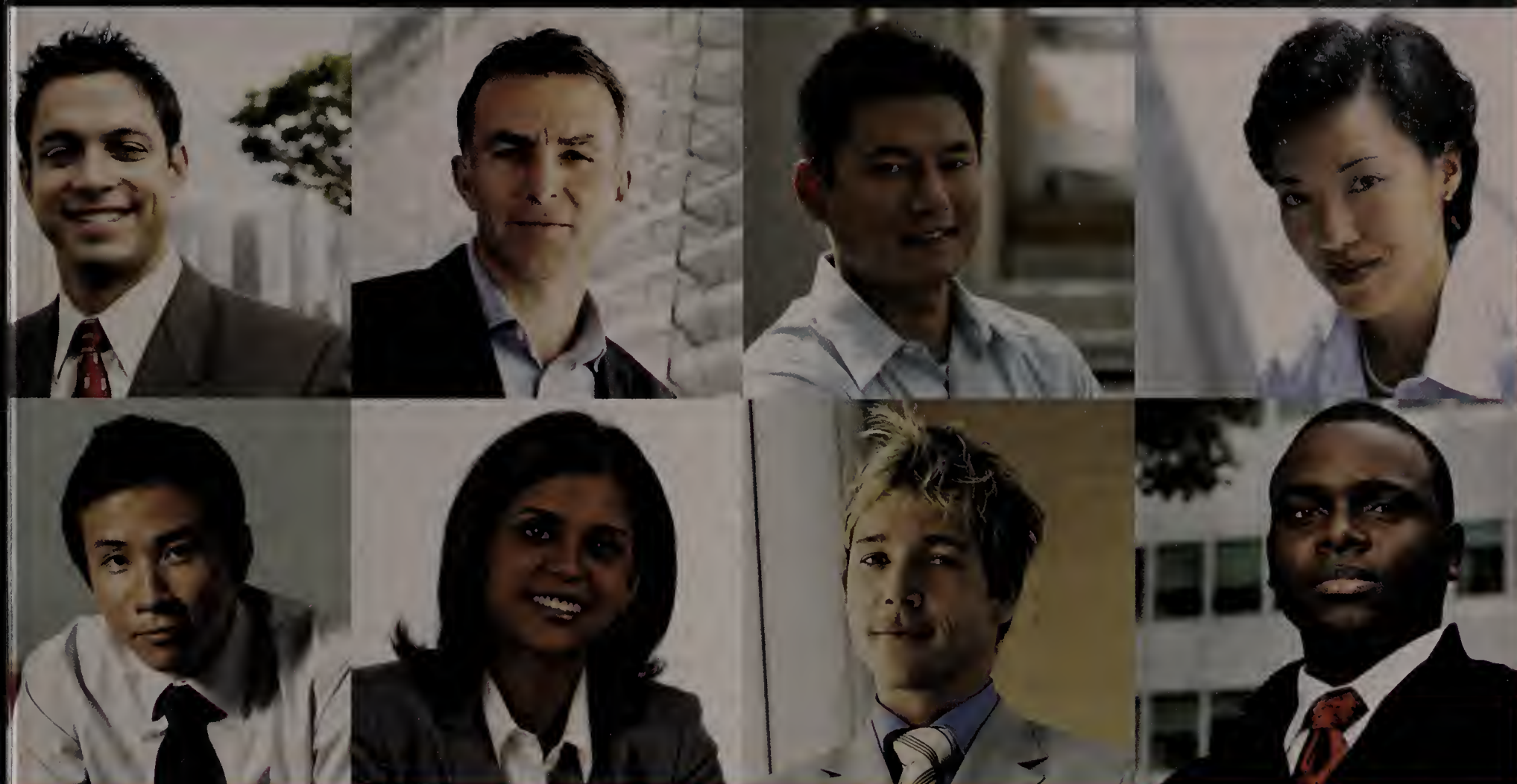
Business needs drive decisions to go ahead with new initiatives

DECISION FACTOR

Urgency of the business need	72%
A cost-benefit analysis	57%
Opportunity to increase market share	48%
Success of previous company innovations	28%
Gut instinct	16%
CEO mandate	16%
Other	14%
What competitors are doing	10%
A strong risk-mitigation plan	10%
Adequate security/protection of customer privacy	9%

Respondents chose their top three.

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overload work," he explains. "People were willing to go beyond the demands of their jobs because of the excitement of it."

To give his staff more time to explore the moneymaking possibilities of the wireless project, Smitherman also used some of the government grants to hire additional workers for it. "We're stretched very thin and asked to do more with less every year," he says. "This gave us that first edge to enable us to innovate."

Closer to the Mission and the Customer

An important step to making IT a contributor to the top line is getting closer to the customer at the end of the line. At CIO 100 honoree Discover Financial Services, that's a no-brainer. Technology is the business for the \$3.5 billion credit card company, and the IT department partners with its various functions. "IT is not any different than the call center guy," says Discover CIO Diane Offereins. "Everyone

to pursue new growth opportunities in emerging international markets. IT's close alignment with that mission enabled an alliance with China UnionPay to proceed quickly. IT teams throughout Discover, including the Pulse, security and engineering departments, worked cooperatively with their respective business customers on the project from day one. At each step, IT was there to "make sure we're able to capitalize on opportunities like this," says Offereins. "It's different from what goes on in the product development group where you're testing all kinds of different things and taking them to market."

The long-term agreement signed last May will lead to the acceptance of Discover Network brand cards at UnionPay ATMs and point-of-sale terminals in China and acceptance of China UnionPay debit cards (920 million and growing) on Discover's Pulse network in the United States. The network will be fully operational by the end of the year, making Discover the most widely accepted American credit card in China.

"For IT departments to contribute to revenue growth, they have to understand and share in the mission of the company," says Forrester's Orlov. "It's important to introduce processes to help the IT organization understand the mission through sending them out into the business and making sure businesspeople know IT."

At Discover, IT and business are joined at the hip. But that's not the case everywhere. At CIO 100 honoree Foley & Lardner, CIO Douglas Caddell and his team had to sell management on the idea of IT as a strategic partner that could bring new revenue into the \$610 million corporate law firm.

To do that he went straight to the clients to find out what technologies the firm could offer to support their businesses. After attending countless conferences and forums to talk to corporate general counsel, he figured it out. "GCs [general counsels] are at the

bottom of the IT food chain in their corporations. They're looking for anything that might make their life better," says Caddell. "If a law firm can provide them tools that will make their jobs easier, that goes a long way toward creating a tighter bond with them and getting more business."

Caddell began developing a suite of Web-based technologies tailored to the needs of the law firm's clients, such as a case management system, litigation tools and a best practices repository. "I had an idea of what I thought the customers were looking for," he says. "I didn't do it in a vacuum, but I didn't ask for permission either."

Called Foley:ClientSuite, the system was rolled out in 2003 to 150 of Foley's most IT-savvy lawyers to offer as a free incentive to grow business with existing clients. It worked: The system helped the firm expand its business with Bank of America. "Our chairman Ralf-Reinhard Boer said it's what got him in the door down in North Carolina [at Bank of America]," says Caddell.

"Senior leadership now recognizes it as a true competitive advantage for increasing business value."

Though he isn't able to quantify the amount of business that can be attributed solely to the introduction of ClientSuite, today half of Foley's attorneys and 450 clients use the system.

Caddell has since hired a full-time technology consultant and salesperson to engage internal users and external customers in further system development. "She works with the lawyers to help the customers understand the value of the technology and how they might be able to implement it," he says. "She finds out what will make it work better for them."

The IT department is on its third version of ClientSuite, which offers such enhancements as a more robust searching function, advanced

{Continued on page 60}

STEAL THIS IDEA

Called to Account

To help his IT leadership team understand and internalize business priorities, YRC Worldwide CIO Michael Rapken assigns "accounts" to the six members of his IT leadership team, making each person responsible for serving specific operating companies or corporate functions such as HR. The manager tracks business objectives and priorities related to his accounts, including revenue generation, and looks for ways that IT can help enable them.

is focused on how our work impacts the business because our product is delivered by technology."

Offereins has a robust R&D group within IT that analyzes the business opportunities presented by new customer-facing products enabled by technology, such as cell phone wallets and teen or family cards, and a new project forum that "positions us well for new revenue-generating opportunities," she says.

One of the company's top priorities is

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Business Technology Leadership

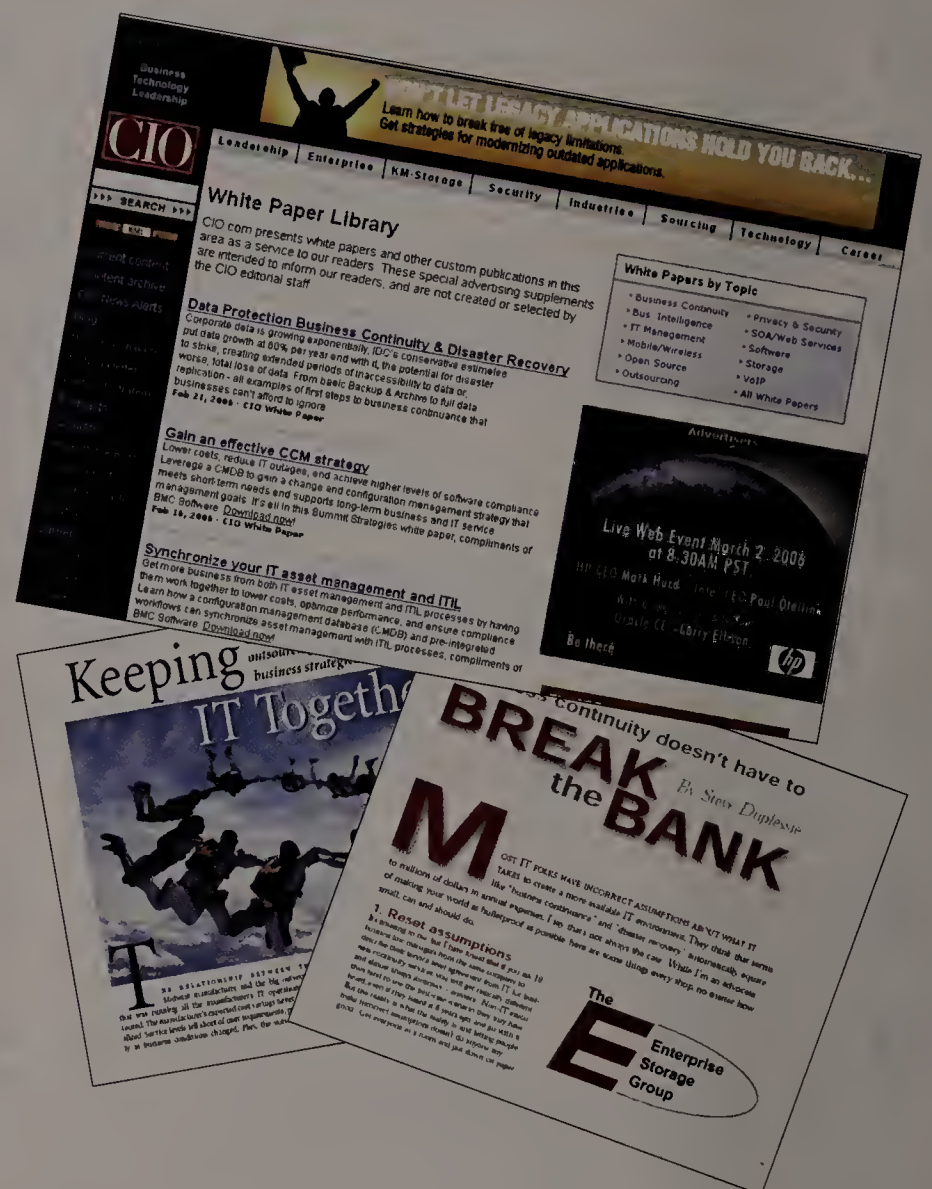
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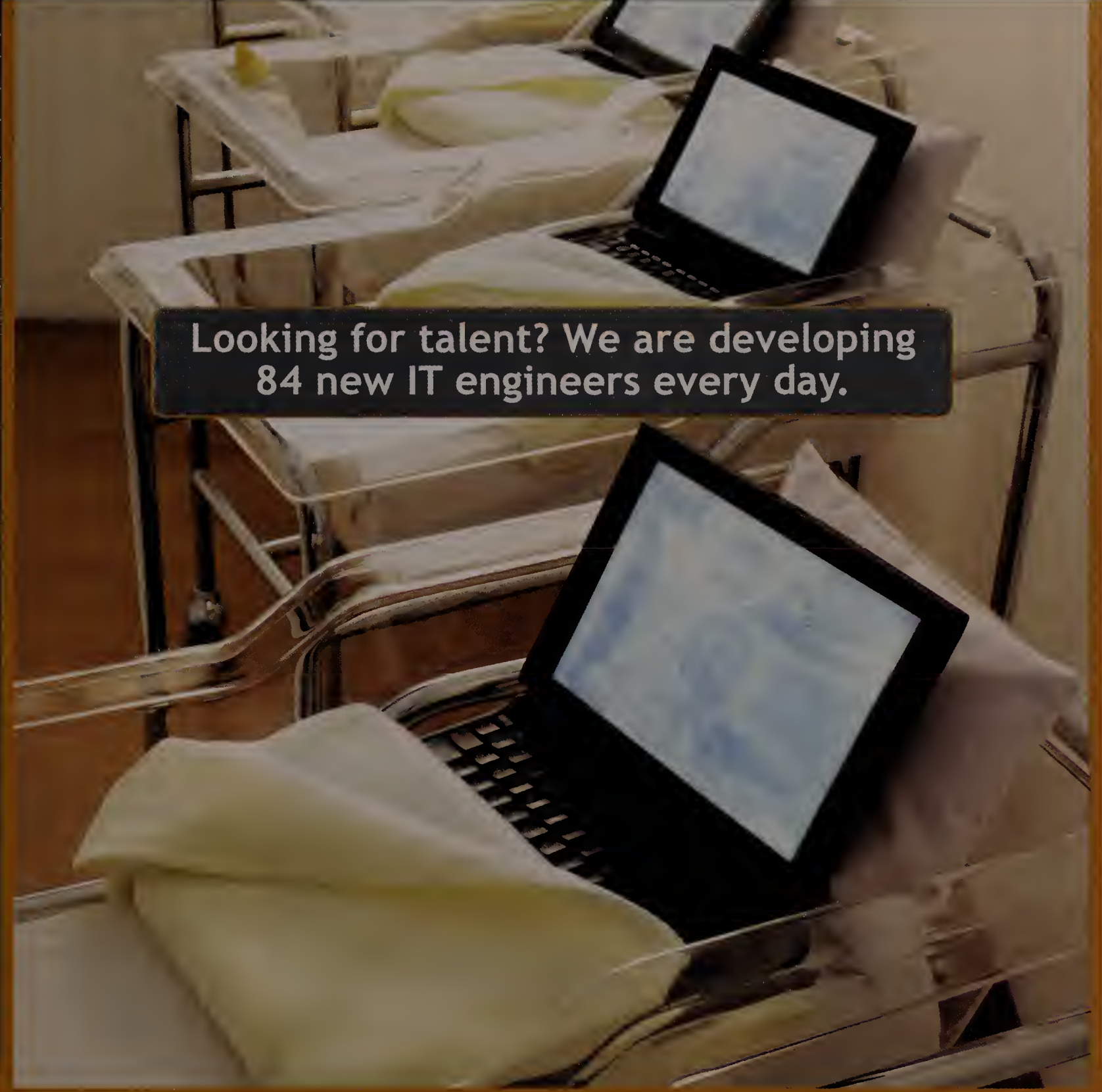
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Foley & Lardner CIO **Doug Caddell** had to make the case for IT's role as a revenue enabler at the law firm.

{Continued from page 56} security and integration with MS Outlook. And IT has become a top-line partner at the firm. "This increased our credibility," says Caddell. "We're not just an expense to minimize. We're an investment."

The Need for Speed

The benefit of a revenue-enabling project can be fleeting—what creates competitive

enable revenue. And there's no shortage of people who want to work on such projects. "Revenue generation has a naturally positive, expansive aspect to it. People are more enthusiastic about it, particularly people in the technology department," she says. But staffing such projects properly is important.

The shared network with China UnionPay, for example, needed to deploy quickly to leapfrog the competition and prepare for the increase in U.S.-China travel that will accompany the Beijing Olympic games in 2008. It also involved a great deal of complexity, from technology standards to time zones. Offereins and her technology management team needed to decide quickly who was most qualified to lead and staff the project. To speed staffing ramp-up, she relies on a core

advantage and new business growth today can be the cost of doing business tomorrow. At Foley & Lardner, Caddell knew it was only a matter of time before rival firms would develop systems similar to ClientSuite. To keep its advantage, IT would have to quickly develop and roll out enhancements.

Doing so meant creating an internal development staff to get the technology built and updated as fast as possible. Caddell employs seven developers—a lot for a law firm. Overall, his IT department grew 14 percent over the past three years, and Caddell has realigned his resources around client-facing technologies and Web development.

"It's a whole new level of challenge and responsibility. If it doesn't work, it's going to be a revenue disabler. And that's not what you want," he says.

The IT team was able to develop and roll out each version of ClientSuite in less than six months. "It's been fairly robust and rapid development. But we don't impose any artificial deadlines," says Caddell. "You have to be willing to take a risk, but don't be risky."

Discover's Offereins says there's often more urgency around IT projects that

{Continued on Page 64}



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{Continued from Page 60} group of people whose skill sets make them ideal for complex, high-profile projects.

"You have to know your people and capabilities to quickly pull a team together to meet the demand when opportunities like this come along," Offereins explains. As a result, Discover was able to process the first successful China UnionPay transaction on its U.S. network less than five months after the deal was inked.

Loosening Up

During the past few years, technology organizations got really good at consolidating systems and introducing standards across the enterprise—perhaps too good. "It should be a benefit," says CISR's Ross. "But the risk is that some people assume that if some standards are good, more are better and most are best. You develop a culture or mind-set that can't let go of cost-cutting constraints."

To enable top-line growth, IT departments have to loosen up. "You have to be more flexible to seek out new revenue," says Tom Bugnitz, senior consultant with the Cutter Consortium.

Developing the Web-based corporate sales center application at YRC required IT to loosen up and retool its thought processes about Web development. It meant abandoning its traditional ASP, back-end server approach to developing presentation and content delivery in one program for a more dynamic Ajax-like approach to deliver XML data separately from the static presentation page directly to a user's Web browser. The potential benefit was clear: It would minimize CPU, bandwidth and end user response time. But at the time, the acronym Ajax didn't even exist and the approach was neither widely employed nor well understood.

It was critical to manage the risks associ-

ated with the changes the new system would require of both IT and the system's users. To get buy-in from the IT staff, project leaders explained the advantages of the new Web development approach and how it would work. To make sure the affected customer service constituency was on board, YRC used a team-based approach to gather requirements and develop the application, involving representatives from the eight business groups affected. The team employed an appreciative inquiry tool that allowed them to envision the new call center improvements and build consensus around the proposed changes in business processes.

"Having processes and standards shouldn't discourage creativity, as long as there is a part of your process for problem solving," says YRC CIO Rapken. "You have to continue to encourage folks to think creatively, position it as a problem to solve, and then get out of their way."

The new mix of technologies and Web development methodology is now being used to enable top-line growth for other YRC projects that require a rich and high-speed end user experience. "Enabling revenue generation will be a continued focus," says Rapken. "That's good for the business. And it's good for IT."

At Ball State, IT's role has transformed rapidly from enforcing standards and technology choices to exploring and testing the newest technology and its revenue-generat-

STEAL THIS IDEA

Walk in Their Shoes

Revenue comes from end customers, but IT is often far removed from them. Remedy that by having IT staff spend time with internal and external customers, says Michael Rapken, CIO of YRC Worldwide. "We call it, 'Walk in their shoes,'" he says. "Our staff spends time in the business operations with end users, so we can see how they use the technology and the systems we supply, to serve customers. It also increases the IT staff's business knowledge."

ing potential. But Smitherman is careful to make sure IT does not abandon its core customers as it pursues emerging technologies.

"If you're going to take risks like this, you need to mediate the imposition on the rest of your customers," says Smitherman. "And spread the benefit to as many constituencies as possible."

For example, Smitherman positioned the Digital Middletown Project and the Office of Wireless Research and Mapping that grew out of it as an opportunity for Ball State's students to get work experience to make them more marketable and for faculty to do applied research in their areas of study. Internal constituents such as the geography department and the Teacher's College got involved and benefited.

With the project, IT proved its flexibility and out-of-the-box thinking—and its ability to make money. "Every time you have a success, that gives you more credibility," says Smitherman. "It gives us the freedom to do other things that will not only continue to cut the institution's costs but also have the possibility to generate revenue."

Smitherman and his team are currently looking at the success of such ventures as rich media site JibJab and social networking site FaceBook and exploring the ways in which Ball State might profit from such IT applications. Perhaps, there's even a business spin-off in there somewhere.

"The real opportunities for generating revenue all come from the intelligent use of technology," says Smitherman. "And what better place is there to do that than in IT?" **CIO**

Making the Case

For a look at steps CIOs can take to help IT recover its innovation and revenue generating functions, read Forrester's report "Make IT Matter for Business Innovation," found at www.cio.com/cio100.

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Senior Editor Stephanie Overby can be reached at soverby@cio.com.

Technology

IN THIS STORY

- * Goodyear
- * JEA
- * Monsanto
- * NOAA's Undersea Research Center
- * The Ohio State University Medical Center

Imagination at Work

Robots.
Supercomputers.
AI. Five CIO 100
honorees are
boosting
revenue, cutting
costs and maybe
saving the planet
with these
and other cool
technologies.



BY MERIDITH LEVINSON



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If necessity is the mother of invention, then capitalism is surely the mother of innovation. Five of this year's CIO 100 honorees were driven to develop unique applications of undeniably cool technologies by the almighty dollar (the need to make it and to save it).

The Goodyear Tire & Rubber Co.'s use of computer simulations to bring new tires to market has reduced the company's costs and driven revenue growth. Software developed by Monsanto is helping it breed genetically superior seeds that big commercial farmers are buying in droves. To prevent its energy costs from skyrocketing, public utility JEA implemented an intelligent system that determines the perfect mix of oil and natural gas to produce electricity while minimizing nitrous oxide emissions. The National Oceanic and Atmospheric Administration's (NOAA's) Undersea Research

Tools for Change

- ✧ Innovate, then replicate. Leverage investment in new technology across the business where possible.
- ✧ Drive collaboration. Bring talented employees from different functions together and let them run with an idea or project.

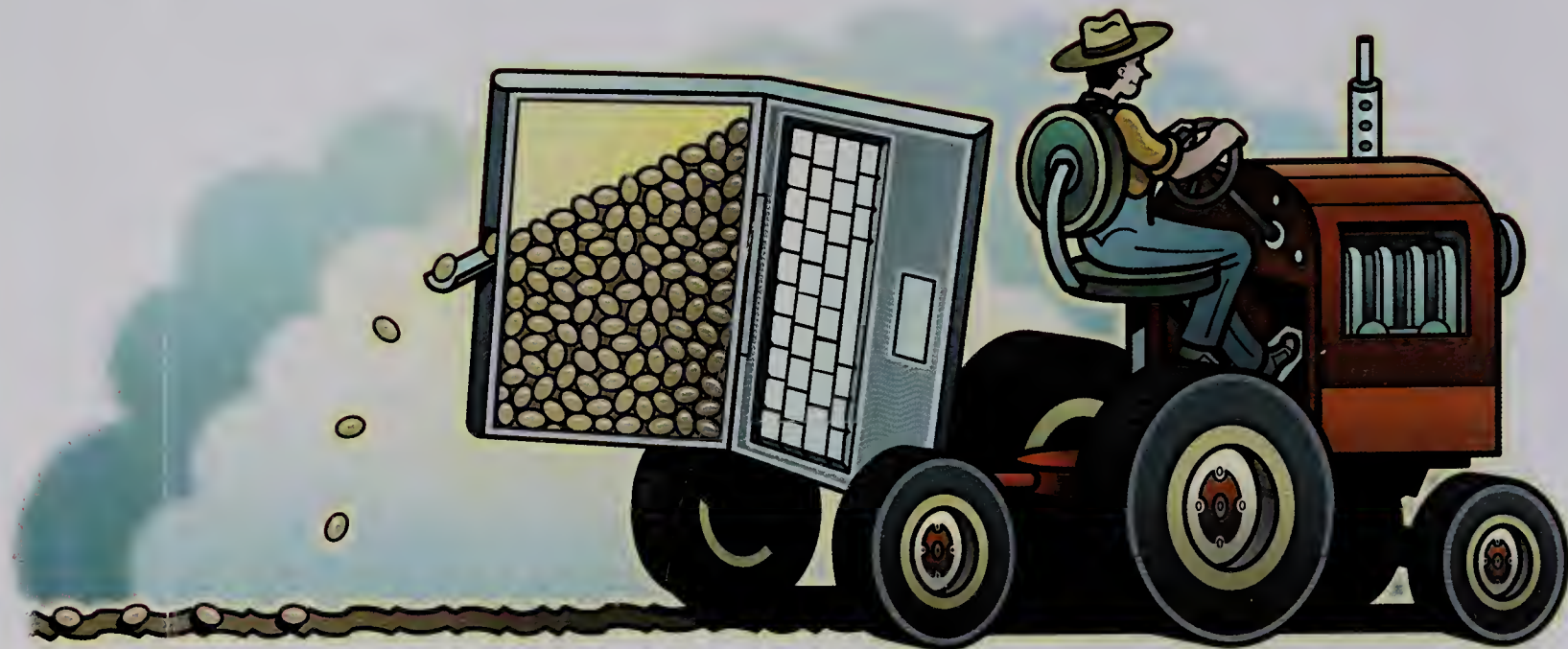
Center built a network capable of transmitting large video files from an underwater lab to the Web in seconds to raise public awareness and government research funding. The Ohio State University Medical Center freed up maintenance staff and increased customer satisfaction by deploying robots to handle tasks such as removing trash and transporting meals.

The five companies feted in this story didn't pursue technological innovation for its geek

chic; they did it to create a sustainable competitive advantage. "At the end of the day, as cool as this thing [we've developed] is, it's a tool," says Stephanie Wernet, Goodyear's CIO. "It is meant to serve a business end. In our case, this tool lets us put out new, more innovative products faster than the competition."

You don't have to be Goodyear's size to do something cool. The key to innovation isn't money. It's curiosity and collaboration. Getting the brightest minds from different functions working together on a problem is how great things happen. What made the technologies featured so useful and the efforts to develop them so fruitful was tight-knit cooperation between IT and other departments.

Read on to find out what each company did, why they did it, the significant benefits they're scoring as a result and what you can learn from their innovations.



Seeds of Change

What: Monsanto's IT department created software to identify genes that indicate a plant's resistance to drought, herbicides and pests; those genetic traits are used to predict which plants breeders should reproduce to yield the healthiest, most bountiful crops. The software crunches data from breeders worldwide and presents it in a colorful, easy-to-comprehend fashion. By pinpointing the best breeding stock, it increases breeders' odds of finding a commercially viable combination of genetic traits from one in a trillion to one in five. Monsanto's global breeding organization drove the project.

Why: When its signature weed-killer Round-up went off patent, the St. Louis company invested in growing its seeds and genetic traits business, which comprises more than half of its \$6.3 bil-

lion revenue and \$255 million profits in 2005. Monsanto believes it can sell more corn, soybean and cotton seeds if farmers know its seeds will produce heartier crops and require fewer sprays of insecticide and herbicide, thus reducing costs.

Technology: The software is written in Java and .Net. The Java components run on networked Linux and Unix servers; the .Net components run on Windows XP in machines at the breeding stations.

Cool quotient: Monsanto's scientists use the software to effectively engineer seeds to resist drought and pests and to produce plants that are healthier for humans and animals to eat. They do it by implanting those seeds with the genetic material that makes a plant resist

insects or produce more protein. What would Gregor Mendel, the father of genetics, think of this? "This is really different from the way breeders bred their crops," says Monsanto CIO Mark Showers. "They didn't have this level of molecular detail to determine and select plants they wanted to move forward from year to year."

ROI: Monsanto reaps the benefit of its software but wouldn't reveal development costs. Earnings per share on an ongoing basis grew from \$1.59 to \$2.08, or 30 percent, from 2004 to 2005. Its EPS is expected to grow by 20 percent more in 2006. "In the last four or five years, we've had a marked improvement in taking market share from our competition. We've grown our share at a couple of points per year," says Showers.

The Recipe for New Ideas

The top three ingredients of honorees' innovative business culture

One

72%

Innovation-focused leadership

Two

57%

Smart, creative people

Three

56%

Good business-IT alignment

The School of Hard NO_x

What: Public utility JEA used neural network technology to create an artificial intelligence system it implemented last fall. The system automatically determines the optimal combinations of oil and natural gas the utility's boilers need to cost-effectively produce electricity given fuel prices and the amount of electricity required. It also ensures that the amount of nitrous oxide (NO_x) emitted during the generation process does not exceed government regulations.

Why: JEA needed to decrease operating expenses, in particular fuel costs, as oil and gas prices began their precipitous ascent in 2002. Forty percent of JEA's \$1.3 billion budget goes to the purchase of oil and gas to power its boilers, so a small change in the way electricity is produced could send millions of dollars to the bottom line.

Technology: Neural network technology models the process of producing electricity. Optimization software from NeuCo determines the right combinations of oil and gas to produce electricity at low cost while minimizing emissions.

Cool quotient: JEA, which serves over 360,000 customers in Jacksonville and three neighboring Florida counties, is the first utility in the world to apply neural network technology to the production of electricity in circulating fluidized bed boilers. It built a system that makes decisions based on historical operating data and as many as 100 inputs associated with the combustion process, including air flows and megawatt outputs. The system learns which fuel combinations are optimal by making adjustments to the boiler in real-time; it also forecasts what to do in the future based on specific fuel cost assumptions. "We had issues with oil prices. At the same time, gas prices went from \$4 a BTU to over \$14. We need to use gas because it decreases emissions. This solution helped us balance all of those items," says Wanyonyi Kendrick, JEA's CIO.

ROI: The project, which IT drove, cost \$800,000 and paid for itself in eight weeks. The system reduced the quantity of natural gas that's used to control NO_x emissions by 15 percent, an estimated annual savings of \$4.8 million. With natural gas prices at \$11 per BTU, JEA expects to save \$13 million on fuel in 2006. What's more, JEA has discovered it can use the new technology applications for its water business.

Where the Rubber Meets the Road



What: Working with Sandia National Labs, Goodyear's IT department developed software to design and test tires virtually. In the past, the company built physical prototypes and tested them by driving thousands of miles on tracks. Using a mathematical model, the soft-

ware simulates tire behavior in different driving conditions so the designer can see how the tire gets pushed, pulled and stretched as it rolls down a road, hits bumps, turns corners, screeches to a halt, and grips the road in wet, dry and icy conditions.

Why: Accurately testing prototypes in the physical world requires driving on the tires for thousands of miles; Goodyear wanted to shorten that time to get its products to market more quickly. Three research and development employees advanced the idea of testing prototypes using computer simulations, which could do the job faster. The company had never done simulations but figured initial investments and subsequent maintenance costs were worth the payoff. Goodyear's cost of goods sold as a percent of its sales decreased by 2.6 percent from 2003 to 2004, the year its first fully simulated tires hit the market. Meanwhile, the R&D budget for tire testing and design decreased by 25 percent.

Technology: Custom-built software runs in a massively parallel computing environment, on hundreds of processors on hundreds of Linux computers. Goodyear invested more than \$6 million to build this high-powered computing environment. It plans to expand and upgrade its Linux clusters to meet business demands for new tires and to improve the fidelity of its virtual tests.

Cool quotient: Goodyear believes it is the first tire maker to use computers to design and test its wheels. Although the auto industry has done computer-assisted design work since the 1980s, the technology had not been applied to tires because their malleable materials made simulation difficult. The math required in order to model a tire on a computer is as complicated as that needed to simulate a nuclear explosion, which is why Goodyear partnered with weapons researcher Sandia. "This is freakingly cool stuff. It's way more power than any IT guy should have, and we have it! Ha-ha-ha-ha!" fiendishly laughs CIO Wernet.

ROI: Designers can perform 10 times more tests, reducing a new tire's time to market from two years to as little as nine months. Goodyear attributes its sales growth from \$15 billion in 2003 to \$20 billion in 2005 to new products introduced as a result of this change.

STEAL THIS IDEA

Go With Your Gut

When two Goodyear employees approached CTO Joseph Gingo with the idea of designing and testing tires on computers, Gingo put them on the task. He trusted his two PhDs even though part of him thought the idea was hare-brained at the time.

The Life Aquatic

What: With just \$70,000, Dominic Landucci, network administrator for NOAA's Undersea Research Center (NURC), constructed the network infrastructure to connect NURC's Key Largo office with its laboratory near a coral reef on the ocean floor, nine miles off Florida's southern tip. Called Aquarius, the 400-square-foot lab serves as home base for divers studying the reef and as a training camp for astronauts adjusting to weightless life in close quarters. Landucci's network, which he began building in 2003, lets NURC and NASA employees on land communicate clearly via voice over IP with colleagues in the lab or on dives. The network is robust enough to transmit real-time streaming video to the Web so the public can see the oceanographic research NURC scientists are doing or the training astronauts are getting.

Why: Existing voice and data transmissions were choppy and the infrastructure outdated," says Landucci. "The video equipment often crashed, and the voice over IP system was old." NURC also wanted to transmit better images to spark public interest in the lab's mission and make a compelling case for funding each year.

Technology: The voice and data connection between the undersea lab and the office is facilitated through wireless and wireline communications. A 180-foot-long wire run-



Deep Dive

Take a **VIRTUAL TOUR OF NURC'S UNDER-WATER LAB AQUARIUS** and check out videos from recent missions at www.cio.com/cio100.

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ning between the lab and a 30-foot buoy bobbing on the waves transmits voice and data. Installed on the buoy is a point-to-point broadband wireless Ethernet bridge from Orthogon Systems. The vendor designed it with two antennae to overcome the buoy's movement and the refraction of radio signals on the water, which made communications choppy. From the buoy, the broadband wireless system sends voice and data signals to audio and video servers and to the office's Vonage VoIP network. Open-source Darwin Stream of Server software processes the video feeds and serves them via the Web. A videoconferencing device from Polycom lets NURC employees on land talk to and see the divers.

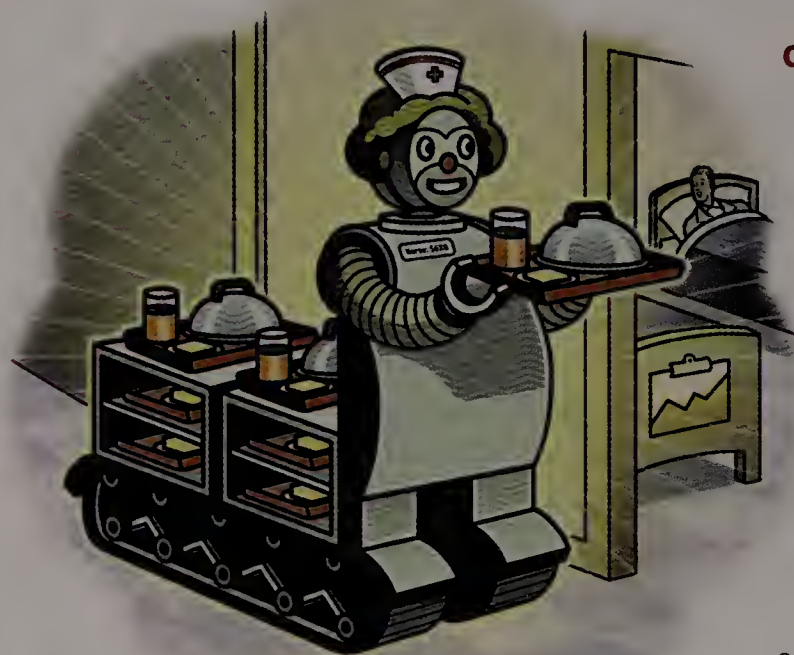
Cool quotient: Landucci used standard communications technology to build the network. With the same technology and the excess bandwidth the new network provides, an astronaut on the International Space Station can talk to an aquanaut in the undersea laboratory. "I have the capability to make that happen. I just haven't done it yet," he says.

ROI: Phone calls between scientists in the lab and NURC employees on land are now as clear as the skies above Key Largo. The link from the habitat to the buoy was upgraded from a speed of 10Mbps to 100Mbps. Video streams have gone from 30-second delays to three-second delays. Landucci says he's saved NURC some monthly costs by using open-source software and donated equipment. He estimates that a private branch exchange phone system would have cost \$20,000.

More innovations on Page 72

Robots Come to Health Care

What: The Ohio State University Medical Center (OSUMC) replaced its overhead rail transport system with 46 self-guided robotic vehicles to move linens, meals, trash and medical supplies throughout the 1,000-bed hospital. The robots do not interact with patients; they carry out routine tasks hospital staff used to do.



Why: Faced with declining revenue and rising costs, OSUMC needed to save money while improving patient care. A steering committee comprising IT, other hospital departments, consultants and vendors drove this project. They convinced medical staff of its value by demonstrating the technology and communicating how it improved working conditions and patient care. Materials transport was identified

as a place to cut costs since the hospital needed to upgrade the existing system.

Technology: The robots, made by FMC Technologies, are guided by a wireless infrared network from Cisco Systems. The network is embedded in corridor walls and elevators designed for the robots' use. Three Windows servers linked to the network maintain a database of robot jobs and traffic patterns.

Cool quotient: OSUMC was the first hospital in the United States to implement an infrared-guided automated system for transporting materials. Hospital staff use a touch-screen computer connected to a server to call a robot when, for example, a linen cart needs to go to the laundry room. To get from point A to point B, the robots rely on a digital map of the medical center programmed into their memory; they also track their movements against the number of times their wheels rotate in a full circle. So if it takes a robot 1,000 wheel revolutions to get from a building's kitchen to the sixth floor, and its wheels have moved in 500 revolutions, the robot knows it is half-way there. If a robot loses network contact, it shuts down.

ROI: The \$18 million system is expected to save the hospital around \$1 million a year over the next 25 years. Since it went live in 2004, OSUMC has saved \$27,375 annually on linen delivery alone. OSUMC's CIO Detlev "Herb" Smaltz says the system improves patient care by freeing up personnel: "If we can take mundane jobs like taking out the trash off of our employees and give them more time to do the things they came into the health-care profession to do, then that's an added benefit of the system." **CIO**

Senior Writer Meridith Levinson can be reached at mlevinson@cio.com.

Getting Cozy

CIO 100 honorees **GOODYEAR** and **MON-SANTO** offer two models for fostering collaboration between the business and IT. Learn more at www.cio.com/cio100.

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STEAL THESE IDEAS

Finagle Free Equipment

NOAA's Undersea Research Center obtained free networking equipment from vendors such as Cisco. Vendors often donate products and services to organizations working on innovative projects because it's good PR.

Get Everyone Involved

The secret to the success of Ohio State University Medical Center's robot deployment was the involvement of stakeholders from different divisions and departments, including IT, clinical care administration, facilities services and purchasing. Each brought a unique perspective to the planning table.

Ask Around

JEA got the idea to use artificial intelligence and neural networking to regulate its boilers by asking other utilities and energy companies about technologies they were using.



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SOA Governance

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Services

In Sync

BY GALEN GRUMAN

Service-oriented architecture is a route to IT anarchy if you don't effectively manage the development and use of services

Mike Bartell, CIO of the Federal Deposit Insurance Corp. (FDIC), knew he was facing a project that could make or break his career. It was a transformation of the way the federal government tracks cash flow among U.S. banks and monitors financial reports and compliance statistics, to ensure the U.S. monetary system remains in good health. The three agencies involved—the FDIC, Federal Reserve Board and Office of the Comptroller of the Currency—had multiple systems to handle the different processes, glued together over the years in what was an increasingly inflexible system.

The challenge: Re-architect those systems into a more flexible whole based on reusable, consistent components in a service-oriented architecture (SOA). The project, which began in 2003 and is continuing, strives for the kind of business value and technical sophistication that wins awards—like the CIO 100.

GOVERNANCE STRATEGIES

- * Create an enterprise architecture group to govern SOA.
- * Pick processes that can be shared as the first services.
- * Build flexibility in services for security and data sharing.

But with ambition comes risk. SOA's aspirations of more efficient software development and more agile business execution can't be fulfilled unless you manage the architecture, the development processes and deployment properly through IT governance practices. "Governance was seen as essential from the beginning," says Bartell. To ensure cooperation and coordi-

nation, the three agencies—which operate under a coordinating body called the Federal Financial Institutions Examination Council (FFIEC)—created a written agreement, signed by all the agency heads, which stipulated a single set of governance components. “The governance [document] served us well in helping us all reach common ground on key decisions quickly and keeping the business functions and outcome goals clearly defined throughout,” adds Bartell.

The stakes for good SOA governance are much higher than in traditional software development, because SOA links development directly to business operations. Under SOA, software components represent specific business activities (“credit check,” for example, or “find customer record”) that can be mixed and matched into business processes and workflows. Good SOA governance means thinking through all the implications of such interactivity and creating a process for managing the components. A badly managed software architecture will ultimately translate to a badly managed business in the SOA era. “Governance in SOA is important because we’re codifying business services,” notes Judith Hurwitz, president of consultancy Hurwitz & Associates. “It is both a business transformation and an IT transformation.” CIOs hoping to succeed with SOA need to put together a plan for governance even before their developers release the first service to the company, because those services will play a crucial role in determining the future course of the most important business processes of the company. Not looking ahead invites a continuation of the complexity and lack of agility that plagues IT-supported business processes today.

Most early SOA adopters, including five of this year’s CIO 100 honorees, understand the value of governance, but they also realize that they won’t have all the answers to governance issues up front—and that’s OK. “It doesn’t have to be tremendous progress, as long as it’s steady,” Bartell says. What’s more important, he adds, is that he has established a single SOA governance strategy for the organization for the future. “All capital projects going forward are under SOA, as well as any end-of-life systems,” he says.

Governance Begins with Process

Most SOA efforts start with the same governance approach: A joint business-IT group is formed to understand the key business processes, create the services that deliver them and enforce the proper use of the underlying architecture. All five

Guiding Principles for SOA Governance

As you develop your service-oriented architecture, here are six key governance issues to keep in mind—and preferably begin to define—in the early stages:

- * **Business process definition:** Because services are instances of business processes, you need to know what the right processes are. Typically, a joint business-IT group determines these processes and decides which should be standardized across the organization so that the services that deliver them also reflect both the standards and the exceptions.
- * **Architectural compliance:** Just as a builder has to follow the architectural plans and code requirements for a house, so does an IT organization have to follow the service standards and development “blueprint.” Typically, a review board vets all application development proposals to ensure they conform to the architecture. Often, they also identify proposals that duplicate existing resources, to enforce reuse.
- * **Service management:** A repository of services helps developers and business users know what already exists and what they do. This encourages reuse by IT developers and helps business analysts see what capabilities they might be able to exploit in new ways.
- * **Data management:** Just as services can be used and combined in multiple ways, the data they access and act on can come from multiple sources whose context may not be known by all services. This requires a data architecture that makes this context (metadata) explicit so that all services are working from the same set of assumptions, or consistently translating and interpreting the data they use.
- * **Security and compliance:** Because services are not standalone applications, they can interact with each other and be accessed by users in unexpected ways. The development and provisioning policies need to test and validate that this mix-and-match approach does not introduce security or access violations.
- * **Provisioning management:** Because services can be used by lots of ad hoc, composite applications, execution load may be unpredictable. There should be policies for determining access priorities and performance levels under such severe usage, including policies for when to spin out clone services and the supporting IT resources to handle high loads. —G.G.

CIO 100 honorees involved with SOA efforts—the FFIEC, Hygeia, ING Group, KnowledgeBase Marketing and MoneyGram International—imposed that type of governance at the very beginning.

In the project that garnered its CIO 100 honor, the FFIEC deployed several services for accepting and managing

the quarterly financial statements of all FDIC-insured institutions, termed "call reports." This information is shared and analyzed by the three FFIEC agencies, all of which have different systems with different business processes and data standards. By working jointly, these agencies are defining common business processes such as managing reported financial statement information. The agencies build composite applications from these services that all can share, which reduces duplicative and conflicting application efforts, as well as analysis errors across the organizations. And by having a central architectural review board, they can ensure that all new and redeveloped applications conform to the SOA.

Financial services provider ING Group took the same approach in its CIO 100-winning effort. A centralized architectural group helps identify common, shareable processes among its six lines of business, part of a consolidation effort among its many business units, notes Michael Vincent, general manager of corporate operations and information services. Once the business processes are identified, IT develops services to execute them consistently in all business units. "We have a strong reusability drive," says Vincent. "The idea is to

other application components are country-specific, but the SOA approach lets them interact with the common services.)

The goal of SOA governance isn't merely efficiency and reuse, however; it can also be a powerful tool for business process improvement. At CIO 100 honoree MoneyGram, a payments processor, Executive VP and CIO David Albright has created an architectural review board that seeks processes that are candidates for the SOA. If the group finds several variants of an important process inside different areas of the company, it will service-enable the one agreed to be the best so that the entire company benefits from the best practice. MoneyGram's first SOA-based component is

a reusable service that initiates payment transfers. The service integrates with MoneyGram's CIO 100-winning project, called AgentConnect, that lets independent agents initiate various payment services managed through MoneyGram's payments engine, with a more modular set of applications that allow easier deployment and simpler integration with agents' point-of-sale systems.

Repository: Shopping for Services

A related governance step for SOA is to create a repository for the components developed so that you can track and control usage. The FDIC has been using a repository for its pre-SOA software components, so Bartell and his FFIEC colleagues know the value of such a system for IT governance. But they also know they don't yet understand what capabilities a repository will need in the new SOA world. "We haven't filled in the plan, but when we get more mature, we'll build that repository," he says.

At Hygeia, a health-care transaction service provider, CIO Rod Hamilton has begun using wikis, the editable online bulletin boards, to help developers and business analysts track the services available. (The company earned CIO 100 honors for its efforts to create standard, reusable services for its key business processes, such as user validation, document routing and workflow management.) Each wiki contains information on one or more services, which IT and business staff can all easily see and modify, with changes automatically tracked. It's a quick-and-dirty approach, similar to using Excel for rudimentary databases, but this simple technology works because his organization is

small—with a total IT staff of 15. Hamilton knows he'll need a repository as Hygeia develops more and more common services to implement the standard business processes that handle client transaction data in its multiple forms, as well as for specialty services that handle unique client needs.

For all these CIO 100 honorees, the focus on architectural and development rigor is critical: "For successful SOA, 80 percent of the effort is changing the way your

The stakes for good SOA governance are much higher than in traditional software development, because SOA links development directly to business operations.

STEAL THIS IDEA

Plan for a Repository

FDIC CIO Mike Bartell is carefully documenting services today through informal means such as Web lists and Word documents so that he will be ready to create a formal repository when the number of services becomes too many to handle ("in the dozens," he estimates).

create building blocks."

For example, ING found that it could use common services for about 70 percent of its European mortgage-processing application components, saving about \$20 million in future development costs. (The



CIO EXECUTIVE VIEWPOINT

Patching, Server Security and Virtualization

Allwyn Sequeira**Vice President of Engineering and Operations, Blue Lane Technologies Inc.**

Allwyn Sequeira spent two weeks in New York at the beginning of the summer talking to CXOs about Blue Lane Technologies' efforts to simplify patch management by using inline patch proxies to secure servers without touching them. Among overworked CIOs, the response was often: "You can actually do that?" To be sure, the inline patch proxy is a new solution, but it is revolutionary in terms of what it promises to do to keep server farms secure and CIOs more in control. Mr. Sequeira is the vice president of engineering and operations for Blue Lane.

What are the biggest challenges CIOs face in the realm of patch management?

To understand the challenges, it's important to understand what's driving the need to patch now. First it's about securing enterprise software. The second big driver is regulatory mandates, and a big part of that process is ensuring that systems are patched and kept up to date.

The big "a-ha!" for Blue Lane was, instead of patching the server, patch the network protocols where all the threats are manifest.

Companies are increasingly bringing their servers, apps and databases away from proprietary architectures to open architectures operating in a 24/7 mode, all driven by globalization, webification and open services. Before, people would take their time, and only when they had regression-tested all apps across all servers would they be comfortable about releasing a new version. Security patches changed everything. They come in frequently, they come in out of turn, and, in the case of open source apps, they come in a random fashion. It's only aggravated by the frequency of patching due to the rising tide of vulnerabilities.

Exactly what is the problem with server vulnerability patches?

A server, because it's attached to clients and mission-critical data, has a wider impact than the desktop. The second issue is that more manual labor is absorbed in painstaking test cycles and having to manage downtime and host upgrades. It's hard to quantify the impact of server vulnerabili-

ties. But when things go wrong, they go immensely wrong.

When considering a patch management strategy for a virtualized IT environment, does virtualization make the problem worse?

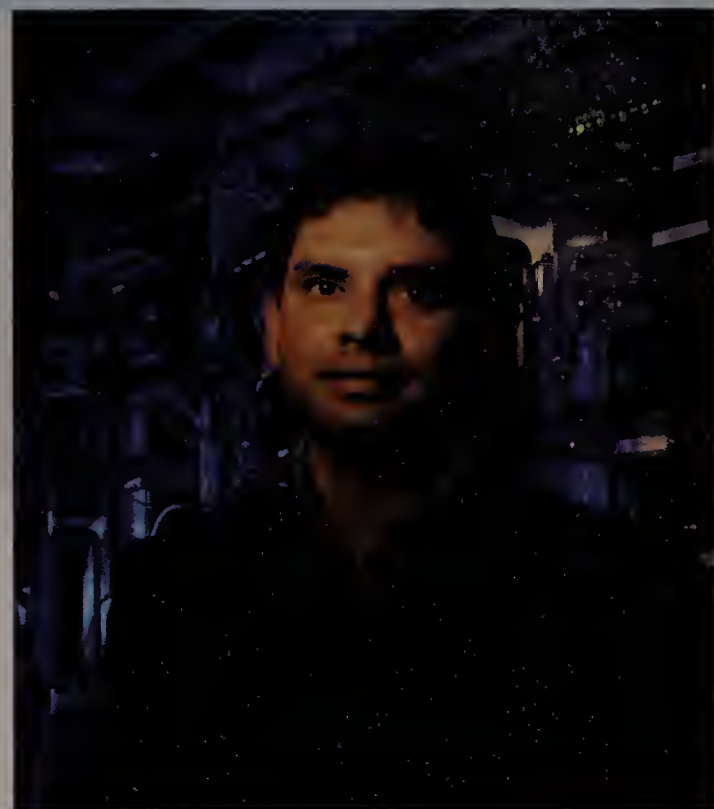
We believe so. People have realized they can snapshot and store a lot of versions of their OS and apps and make these available on demand. But when you go back to that snapshot, it is out of date. The last good working version of the software – that snapshot – was fine from an operational perspective, but it is outdated from a vulnerability perspective.

People who have spent time on virtualization are beginning to realize there are trade-offs, and expenses can move from the cost of hardware to the cost of managing and securing a more dynamic virtual environment.

Why don't enterprises simply hire enough IT pros to make sure everything gets patched in time? What about other technologies or solutions?

People have tried hiring armies of people to do that, but what they are realizing is that it's not a question of jamming thousands of man-hours into one testing cycle. They're trying to hold the line but end up spending more to do it.

In terms of other technologies and solutions, firewalls have helped to limit ports of entry. Intrusion prevention gives you early warning signals that there might be problems out there in the network. But it's a shotgun approach. When they do find stuff, they have only one option – to lock down – and that brings up issues in terms of application availability and database integrity.

**So what is a patch proxy, and how is it different from the status quo solutions we've discussed?**

The patch proxy is an appliance that sits on the network in front of the server farm. The big "a-ha!" for Blue Lane was, instead of patching the server, patch the network protocols where all the threats are manifest. We very specifically and accurately detect what the vendor would have detected; we put in place a corrective action much like the vendor would have done. We may send an error response, we might surgically remove the vulnerable piece of code, we might actually truncate data. So, we have a rich set of parameters where we, in a rifle fashion, detect the issue and then patch the server without actually touching it. That's why we strongly believe the solution we have is such an innovative idea that potentially changes the landscape, and allows IT to focus on proactive initiatives rather than reactive patching. In fact, some of our clients call it "touchless patching."



For more information:

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organization manages the process of the application development lifecycle," notes Dennis Gaughan, research director for IT governance and SOA at AMR Research.

Data and Security Matter

Data management is another key governance issue in SOA. It's important to capture and communicate a standardized context for shared data across the organization so that the data is used as intended. Data integrity and consistency are critical for CIO 100 honoree KnowledgeBase Marketing, since its business is about managing, merging, filtering and qualifying customer

STEAL THIS IDEA

Protect Your Applications

If you deploy Web services for clients or business partners as part of your SOA effort, use a DMZ to shield your applications from peering eyes, says Hygeia CIO Rod Hamilton.

lists. KnowledgeBase has multiple systems for handling data inside the company, and they all perform the same basic functions—data cleansing, list management, consumer matching and data analysis—in slightly different ways, which prevents the company from efficiently combining and analyzing different marketing data for each client's specific project needs. So, in a CIO 100-winning project, the company has replaced the multiple data-cleansing systems with a single core service delivered through an SOA. Now, every business department applies the same cleansing service to all consumer data, ensuring consistent results. And the service orientation means that as the company develops other cleansing, management, matching and analysis functions, all business departments will get consistent results in

Though understanding SOA governance issues is critical, most organizations are tackling the cultural and political issues around defining services first.

what they deliver to clients (who may work with more than one business department), says Brian Camp, senior VP of infrastructure.

SOA cannot emphasize homogeneity at the expense of business performance, however. One of the most important functions of SOA governance is to determine the specific aspects of software components that should not be shared. For example, a software component that performs a credit check may be applicable in many business processes, but those processes may all require different levels of security. Therefore, security has to be thought through in all possible usage scenarios, not just within the context of an individual software project.

For example, at Hygeia, in order to deal with HIPAA rules that require strict monitoring and access control to medical data, Hamilton stores access privileges to the data in databases that are separate from the service software components. Before giving users access to data, the service calls the database to verify access privileges. If the user doesn't have the right privileges, he can't access that data or run that service.

Governance Is Gradual

While analysts such as Gaughan and Hurwitz say that tackling governance issues early is the best policy, they know that most organizations cannot afford to wait on SOA until they define governance fully. "It would be nice to define [governance] up front, but that would make the investment hard to swallow," says AMR's Gaughan. Instead, SOA pioneers are tackling the critical cultural and political issues around defining the right business processes and then retraining their IT staffs—and the business groups—to design sharable, reusable and extensible services that both save money and allow for more rapid development of new business functions. Governance will come along the way.

The CIO 100 honorees exemplify that reality. Like his fellow honorees, MoneyGram's Albright knows what the governance issues are in SOA, but he's gambling that he can develop them as the basic SOA principles of process design and service development take root in business and IT. Getting the basics right will give him the buy-in he needs to invest the people and resources to figure out the other governance issues. KnowledgeBase's Camp has a similar view. "We'll take a

deeper dive when we add more services," he says.

That leap of faith is scary, but necessary, says Hurwitz. "Being timid is not a good thing—people do need to get started now on the processes, understand the stages and develop a road map." **CIO**

Galen Gruman (ggruman@zangogroup.com) is a freelance writer based in San Francisco. Send feedback to Executive Editor Christopher Koch at ckoch@cio.com.

SOA Strategies Explained

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Change Management

IN THIS STORY

- * CAPITAL ONE
- * CSX
- * UNITED PARCEL SERVICE
- * UNIVERSITY OF CHICAGO HOSPITALS

New wireless networks and devices create more productive work environments. They can also generate anxiety. Here's how to cut the wires so that employees still feel connected.

BY THOMAS WAILGUM

Untethered (But Not Disconnected)

Two years ago, Capital One CIO Gregor Bailer gave up his private office in suburban Richmond, Va., with its view of the woods, in favor of a conference table that put him in full view of his staff. The bold move was calculated to allow rank-and-file workers at the company—not to mention Bailer's C-suite colleagues—to see for themselves how a cubicle-free office environment supported with wireless technology could change the way they worked for the better.

CHANGE MANAGEMENT COUNSEL

- ❖ Executives and managers must embrace change first and lead by example.
- ❖ Allowing employees to test-drive new processes and equipment helps build support for new work environments.
- ❖ Internal processes for IT support and maintenance may need to change to accommodate new technologies.

Bailer quickly found that he and his staff talked to each other more—and more often—which led to greater productivity and better collaboration. Five-minute meetings, which once had to be scheduled up to two weeks in advance because everybody's calendars were jam-packed, started to occur more spontaneously. The open environment “made access to people easier and made the energy level much better,” Bailer says.

Capital One executives and employees alike felt such collegiality had been lost as the credit card purveyor grew from its launch in 1995 to the \$12 billion behemoth it is today. Executives wondered: “How do we keep that feel of that small, entrepreneurial company alive inside of this relatively massive company?” recalls Bailer. The wireless, cubeless work environment, dubbed the Future of Work, turned out to be the answer: A



John West, president of CSX Technology, explained to nervous locomotive engineers what data a new wireless monitoring tool would collect.

STEAL THIS IDEA

Offer a Class in Mobile Etiquette

When Capital One gave its employees the ability to work from anywhere, it created a workshop for them to learn the new etiquette for communicating with each other. The two-hour class covers best practices for effective meeting management and tips for e-mailing on-the-go colleagues, such as how to structure the body of an e-mail to quickly categorize topics like a situation, requests, actions or background. So far, nearly 2,000 employees have taken the class.

year and a half after rolling out the plan, 11 percent of the company's 21,000 employees, executives included, have given up their fixed desks for unassigned spaces and work areas with more sunlight, advanced videoconferencing capabilities and wireless connections.

Capital One's realization of a leading-edge wireless work environment earned it a 2006 CIO 100 Award. But when Bailer and HR chief Matt Schuyler first proposed their plan, some top executives didn't like it one bit. "I was dead-set against the move and came [to it] with a pretty closed mind," one office-dwelling bigwig reported in a survey, which summed up the general thinking. Bailer's decision, along with Schuyler, to be the first to ditch their offices for a prototype Future of Work environment was a key part of their strategy for managing the massive change.

Like Capital One, more than a third of this year's CIO 100 honorees are using wireless technology to different degrees to transform how their employees work. They include:

- **CSX.** Rail operator CSX installed a wireless "black box" in its locomotives that collects information about how engineers are operating the trains. By using the data to coach engineers to drive better, the system has helped CSX save millions in fuel costs.

- **The University of Chicago Hospitals (UCH).** Its Comer Childrens Hospital uses wireless broadband and mobile VoIP phones for communication among employees instead of the traditional public address system, improving productivity,

patient care and nurses' job satisfaction.

- **UPS.** The company reconfigured the handheld devices used by 96,000 drivers, generating greater efficiency from its already mobile workforce. The new devices give the drivers processing directions, as well as more detailed data about their performance.

Along with the benefits, however, the wireless technologies introduced new ways of working that weren't necessarily welcome to employees—or at the very least required extensive training. Success depended on managing changes carefully.

Because wireless technology creates physi-

cal and social disruption—altering where employees sit, their work processes and who they work with—CIO 100 honorees recommend a phased approach that minimizes employees' dislocation. Such an approach includes three essential elements: laying the groundwork for changes in technology and the work environment, redefining cultural norms, and making sure IT staff and processes are organized to support new networks and devices.

"Any project of this scope and scale requires a great deal of communication and coordination between the IT development team and the team members that will utilize the technology," says UPS CIO Dave Barnes. "You have to let everyone involved know exactly what's going on, when it's going to happen, and the business reasons for why it's happening in the first place."

1. Lay the Groundwork

Capital One's Future of Work project took more than three years to develop. During that time, Bailer and his team employed tried-and-true project management techniques to see it through from start to finish. But they attribute the project's ultimate success to their unconventional effort to sell it to employees and executives.

Although there was general support within the company for making the workplace more inviting, at first no one knew exactly what that would entail for specific groups of workers. But Bailer was confident that maturing wireless technologies would play a big role. And so in 2003, the team cleared out an area in one of its buildings and for the next several months tested their hunches about how people might work in an open environment. Schuyler's HR and corporate real estate staff went first; IT staffers joined later.

The team experimented with floor configurations, white-noise levels, paint colors, the height of panels between work areas, and new conference and quiet-zone facilities. The group invited other employees (via the employee portal and personal contacts) to check out the space and give their suggestions, in response to which the team tweaked and retested their design. "We said, 'Stop by and take a look at us,'" Schuyler recalls.

Bailer also gave out wireless cards for laptops so that employees could try out the new Wi-Fi test areas. He quickly ran out of cards. "This was viral; it was magnetic," he recalls. By taking the time to not only talk about the new environment to the employ-

ees but to show them exactly what it was going to look like and allow them to play with the new technologies, Bailer and Schuyler learned what workers wanted as they built support for the change.

"All of these things helped us man-

Change in Action

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age the natural emotions and resistance,” Schuyler says. Among the decisions that eased the transition: They let employees whose workgroups joined the program decide whether they wanted to be mobile, and they designed new work areas for administrative staff who needed dedicated, everyday space. They also provided training to both workers who retained a fixed space and to newly mobile employees (who were equipped with laptops, BlackBerrys and cell phones) in how to work paperlessly now that they had less physical storage space.

The investment in marketing the new work concepts paid off: The company has cut its real estate bill in half in its reconfigured buildings because so many employees no longer require permanent space. According to employee surveys, more than 65 percent of those working in the new environment say they are more productive; it's easier to confer with colleagues, and the time spent in large meetings has decreased, among other measures. In the IT department, collaborative meeting spaces dedicated to supporting agile processes have contributed to a 40 percent improvement in project delivery times. And not one executive who made the switch says he would move back to his old office if given the choice.

Even when employees are used to working wirelessly, a major upgrade of familiar tools requires salesmanship. At UPS, drivers expect regular upgrades of the DIAD—the handheld device that customers sign when they receive a package. But the latest iteration, the DIAD IV, introduced last year, delivered more than incremental change.

UPS made the DIAD smaller and added a plethora of communications technologies, including Bluetooth, Wi-Fi, an infrared port and two wireless transmission standards that enable the device to work with any network. “You throw something at me, and I can talk to it,” says Jack Levis, the portfolio manager in UPS's industrial engineering group and the de facto user representative on IT projects that impact small package operations. In addition, GPS technology will eventually give driv-



Eric Yablonka, CIO with University of Chicago Hospitals, sold wireless to clinical staff as a way for them to learn about the latest medical devices.

ers better directions to pickup and delivery points: It will even be able to tell them, through an embedded speaker, when they're headed the wrong way. Once a driver scans a package and gets a signature, this information is wirelessly transmitted into UPS's tracking systems.

All of this new wizardry meant drivers had to learn how to use the device all over again. The smaller size meant fewer keys, resulting in new sets of keystrokes for some commands and making the new device more difficult to use at first. UPS laid the groundwork for change by testing the device with different groups of drivers.

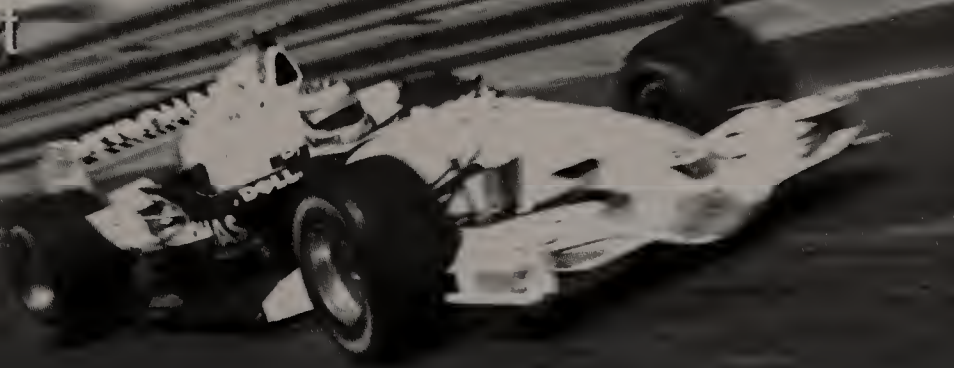
First, developers worked with a small group to test many different keypad configurations, and then sent a prototype to some 750 drivers out in the field to use for a year. The development team incorporated many of their suggested tweaks into the device, such as keys that light up in the dark and a docking station that is easier to handle for drivers with smaller hands.

Next came a 5,000-driver deployment in mid-2005

{Continued on Page 90}

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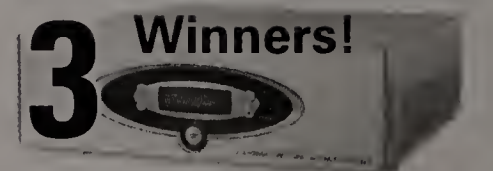
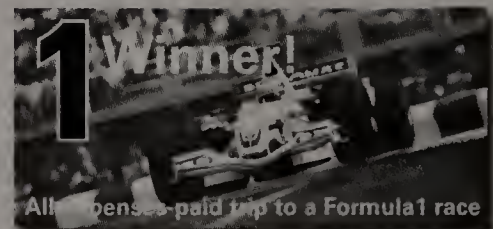
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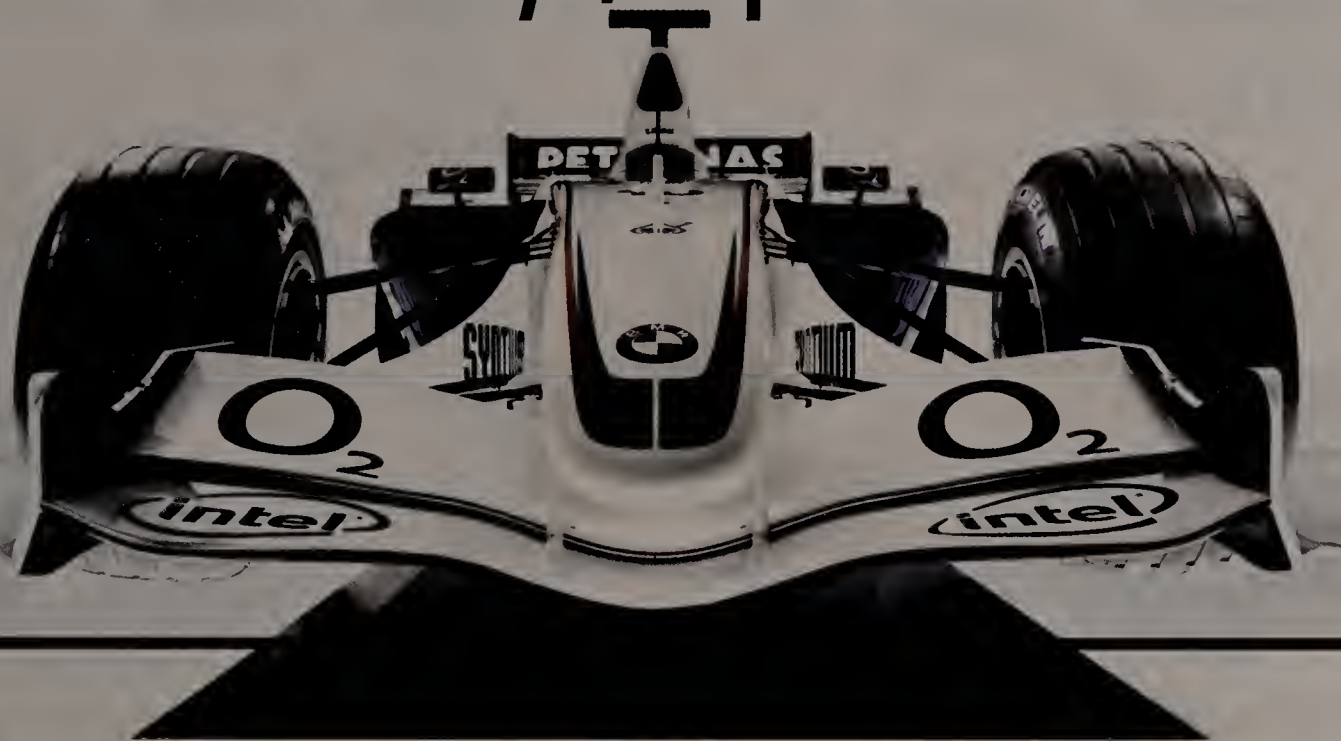
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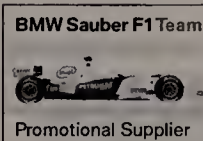


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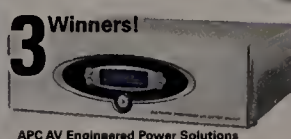
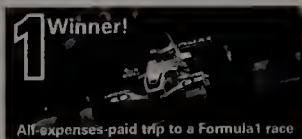
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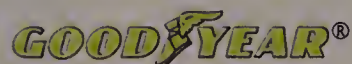
Genius in the Garage

How Hewlett-Packard,
Goodyear and the U.S. government
cut tire design from years to months.



HP's garage (top) and (left to right) Curt Bennett and Lana Rook from HP and Loren Miller from Goodyear.

Students of technology history know that the birthplace of Silicon Valley is a modest wood-frame garage located at 367 Addison Avenue in Palo Alto, California. In this small space, William Hewlett and David Packard launched their test-and-measurement instrument company, Hewlett-Packard, in 1939. So it's appropriate that the most significant innovation in the design and manufacture of a product found in every garage, the ubiquitous automobile tire, is due to collaboration between HP, The Goodyear Tire & Rubber Company and a little-known U.S. government resource, Sandia National Laboratories.



"Creating a virtual modeling capability to shorten the 'design-build-test' process inherent in tire development has been the Holy Grail of our industry," says Stephanie Wernet, vice president of IT and chief information officer of Goodyear, based in Akron, Ohio. "Everyone could see the benefits, but no one knew how to do it. Now, we do." To say this creates a significant competitive advantage for Goodyear, appears to be an understatement: The company's hot-selling Assurance® tire line — the best-selling replacement tires in the company's 108-plus year history — is a direct result of applied technology made possible by the HP-Goodyear-Sandia collaboration. The partnership has been recognized by the editors of CIO, who honored Goodyear with a CIO 100 award for translating IT innovation into business value.

The Challenge of Tire Design

For decades, tires have been developed using a painstaking and time-consuming process. For every new tire design concept, scientists and engineers would mix various raw materials together, extrude the tire's rubber components, assemble them with various reinforcement materials, cure them in a mold, and then test the result, usually by driving the tire thousands of miles. Depending on the test results, they would then re-calculate, re-mix, re-design, re-assemble, re-cure and re-test. This method, or some variation of it, was used to design every tire sold by every manufacturer. While it works, the drawbacks are obvious: high cost, long product development cycles, and difficulty responding quickly to changing market conditions.

Before CAE (computer-aided engineering) and CAD (computer-aided design) applications and the processors needed to run them were developed, auto manufacturers followed a similar process. They would design an entire car, build a model out of balsa wood or clay, and then test it in a wind tunnel to see how it functioned aerodynamically. By the 1980s, though, the balsa wood was gone, replaced by computer-based models that allowed a large number of variables to be measured more quickly and less

expensively. So, why wouldn't something similar work for tires?

The answer, says Goodyear's Wernet, lies in the physical properties and shape of the tire itself. Unlike cars — or for that matter, the virtual dinosaurs in movies such as "Jurassic Park" — tires have flexible reinforcements, not a hard frame or skeleton. These apparently simple, round, black things must be strong but flexible, able to adapt to changing conditions like heat, cold, rain, snow or ice and still provide traction and good tread wear. There are so many possible permutations that, until now, no one has been able to combine the necessary modeling software with the necessary amount of computing power to create a fully functional design-test shortcut.

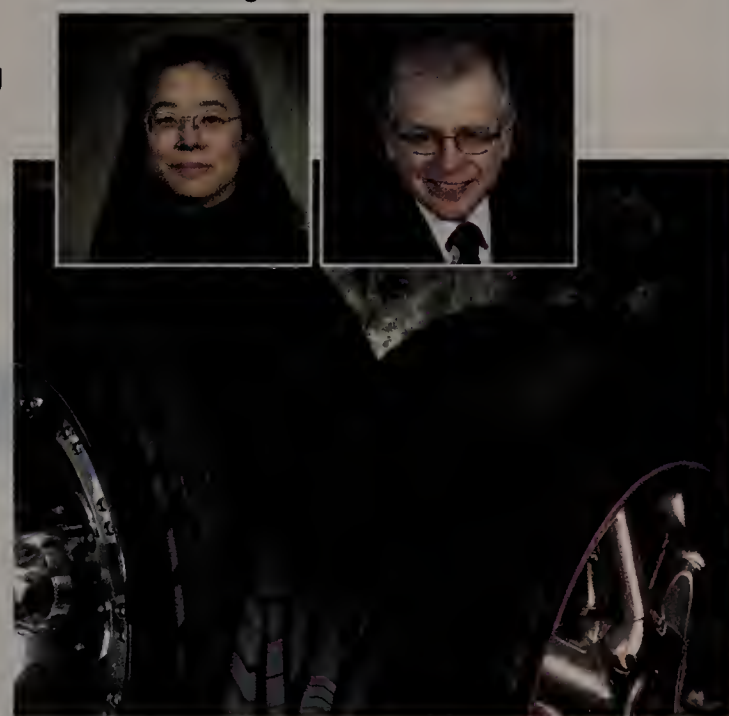
Uncle Sam to the Rescue

There's an old joke about the smiling man at the door saying, "I'm from the government, and I'm here to help you." That may not always be what happens, but there are many instances (the NASA connection to Teflon™ comes to mind) when the vast resources and investments of the U.S. government are supremely important to domestic innovation. Goodyear's collaboration with the Sandia National Laboratories proves the point.

If you've never heard of Sandia, you're not alone. Its name derives from Sandia Base, located in New Mexico, not far from Albuquerque. Sandia, one of the Department of Energy's three nuclear weapons laboratories, was originally known as "Z Division" and was created in 1945 as the ordnance design, testing and assembly arm of Los Alamos. Over time, its focus has shifted to include other national security areas, such as nuclear waste management, energy alternatives and support for the Department of Defense and other government agencies. Behind all the activities, there lies massive computer modeling and simulation

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of applied technol-
ogy made possible
by collaboration
with HP and
Sandia National
Laboratories.**

*Goodyear's Stephanie Wernet
and Joe Gingo*



*Goodyear's
TripleTred Technology®*

"... WE REALIZED THAT WE NEEDED computing power on an almost unimaginable scale, at least from a traditional corporate IT perspective, to handle the work." — Loren

Miller, IT Director for R&D, Goodyear

capabilities in terms of both supercomputer hardware and software and, in the early 1990s, part of Sandia's mission became helping U.S. companies use and improve Sandia technologies for applications in the commercial world.

In 1993, Joe Gingo (then Goodyear's vice president of tire technology, now executive vice president, quality systems and chief technical officer) reached out to Sandia in pursuit of the Holy Grail — using predictive modeling and testing in tire design. Goodyear researchers knew they could do it but needed more computing power than was then available. If Sandia could realistically simulate the conditions caused by a nuclear explosion, why couldn't it help do the same for tires?

Loren Miller, Goodyear's IT director for R&D, has been an integral part of this effort since the beginning. "As the scope and complexity of the Sandia models evolved," says Miller, "we realized that

we needed computing power on an almost unimaginable scale, at least from a traditional corporate IT perspective, to handle the work. We needed to find hardware that could handle the load and develop software to manage the process."

Curtis Bennett, a solutions architect in HP's High Performance Computing division who has been involved with Goodyear solutions since 1998, points out that even the earlier Alpha systems were capable of handling complex CAE and CAD applications. "Goodyear was able to do some predictive modeling based on commercial code products, such as Abacus (a widely-used CAE application) and its own proprietary code from the time we installed the first systems based on Alpha chips," he says. "But, like a lot of engineering problems, as they tried to do more and more detailed analysis, the models got significantly larger because they were modeling more realistic data. So, the more you see what you can do, the more you want to do."

HP'S SOLUTIONS IN ACTION

Four years after Goodyear's Joe Gingo, executive vice president, quality systems and chief technical officer, made his bet on predictive modeling, Hewlett-Packard became Goodyear's technology supplier of choice to begin turning his vision into reality.

HP has been Goodyear's technology source for more than 30 years, but the modeling assignment was based on winning an RFP-based contest. The first assignment was to install a series of Alpha chip-based servers using SMP (shared memory processors) to form the backbone of Goodyear's technology development infrastructure. (Goodyear maintains two major technology centers, one in Akron, Ohio and the other in Colmar-Berg, Luxembourg.)

Three years after that, in 2001, HP won another contract to install several clusters of Alphas based on distributed memory processing. In 2003, a third bidding process resulted in the installation of a third set of systems, this time based on AMD Opteron systems, and just this year, secured the fourth procurement and installation, also based on AMD Opterons.

Today there are a total of six clusters — three in Akron and three in Luxembourg — based on DL145 and DL585 AMD Opteron servers. Neither Goodyear nor HP will say exactly how many servers make up the most recent procurements, but they number in the multiple hundreds.

Getting to "Yes"

HP's two installations of AMD Opteron servers in the most recent Goodyear clusters marks a departure from the Alpha platform, and for Bennett and his High Performance Computing team, that is a significant milestone. "At the time we installed them, the Alpha platforms were the fastest processors available to do floating point (mathematical) calculations. That was a significant competitive advantage. When we competed for the latest procurement, our AMD-based machines were being compared to everyone else's AMD-based machines. So, our advantage was no longer based just on the technology itself."

So how did HP win? Bennett cites three factors he believes led to Goodyear's decision to reaffirm the HP partnership. "First, we understand these applications and how to make them run on our systems," he says. "Second, we are very familiar with Goodyear's needs and their environment. Being inside allows you to know the customer. Third, we build, configure, integrate, test and install our systems very thoroughly, so

that when the system arrives, it does exactly what the customer wants it to do."

Clients such as Goodyear collaborate in a rigorous formal specification process to ensure that both they and HP know exactly what is expected and what HP has to build. Before the first Alpha system was delivered, one of Bennett's colleagues spent time at the Goodyear Technology Centers in Akron and Luxembourg, working with the proprietary Goodyear-Sandia code to create an executable application, which continues to perform on the newer server clusters. Then, Bennett and his team created a benchmark for the system, aimed at maximum processing speed with minimum user inconvenience. "Processing speed, combined with reliability, is always what we are judged on," he says. Finally, Bennett configured the system to function seamlessly, the integration and testing units went to work, and the servers were ready for final installation. With the executable application in place, the same process has been followed for each of the subsequent installations.

Lana Rook, HP's enterprise account manager for Goodyear, underscores the importance of people-process-technology solutions for customers. "Besides the traditional things a company would consider in choosing a partner, such as acquisition cost," she says, "key factors were the expertise of people like Curt Bennett, who brings a lot of knowledge about modeling and materials to the table and also understands the implications of infrastructure and how this technology needs to work to support a business objective. As we've learned more about Goodyear and its needs, it's become a lot easier for each of us to avoid the pitfalls. We now both know what needs to happen."

As the computer industry moves away from proprietary chips such as Alpha and towards standardized chip processing, Rook believes that what will make HP unique is the overall manageability of the environments they create, including the testing and integration capabilities and under-



*Assurance® —
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THE TECHNOLOGY OF TIRES

For a snapshot of how innovative technology enables innovative products, consider the development of the Assurance® tire, Goodyear's best-selling new replacement market product ever. The Assurance®, featuring TripleTred Technology®, has three distinct tread zones on the tire surface: one designed to allow control on wet pavement, another on dry roads, and a third on icy surfaces. The ice zone on the tire is partially composed of volcanic sand, which mixes with the rubber to form a rough surface. The material creates a pumice-like strip that is very effective in delivering grip on slippery surfaces. The tire's development time was dramatically shortened using the combined HP and Sandia solutions. Goodyear's ability to model varying amounts of volcanic sand to add to the mix was a critical factor both in innovating and reducing time to market.

Taking advantage of its technological leadership, Goodyear followed the launch of the Assurance® line with its Fortera® and Wrangler® tires featuring SilentArmor Technology™ for SUVs and light trucks. These tires have a reinforcement layer made of Kevlar®.

Most recently, Goodyear used its virtual design capability to apply carbon fiber, a material used in aircraft, to a high performance tire and introduced the Eagle® featuring ResponsEdge Technology™.

"We've demonstrated that this application of technology reduces tire design from years to months," says Stephanie Wernet, vice president of IT and chief information officer of Goodyear. "Our ability to use new materials, such as volcanic ash, Kevlar® and carbon fiber, and to quickly see results, is entirely based on it. Our modeling and simulation capabilities have exponentially increased our ability to innovate."



standing how to tune a total system. "That's a lot different from a 'sell it by the ton regardless of what it's used for' approach, and that will allow us to compete and win," she says.

The AMD Opteron systems have worked flawlessly. "We thought the HP solution would be the most reliable, and we were right," says Goodyear's Miller. "We have not had a single day of downtime, and we have beaten these servers up. They never rest."

For more information: To receive your own customized view of technology trends, products, services and events from HP, register at www.hp.com/go/myenterpriseportal.

More information about Goodyear's innovative tires is available at: www.goodyeortires.com

{Continued from Page 84} (one of a series of ongoing deployments). To keep tabs on how the DIAD IV fared after each rollout, Levis and UPS management observed the drivers, charting their problems and helping them learn how to use the device. Acceptance took a couple of months, as drivers got used to the new configuration. Eventually, they were won over by the lighter weight and improved ergonomics of the DIAD IV.

"On any project, good management involves managing risks before they turn into roadblocks or deal-breakers," says Levis. The level of back-and-forth between driver, engineering and IT made the change successful. "We listened to as many people as often as we could," he says.

2. Define New Cultural Norms

For CIO 100 honorees like UPS and CSX that have a mobile workforce, a major benefit of wireless technology comes from its capability to collect data on worker performance. For workers at these companies who are used to the independence of being on the road or rails, new systems that can monitor their every move may generate fear. To get workers to accept such systems, managers positioned them as tools for improving performance, rather than as disciplinary devices.

UPS's Levis notes that drivers were apprehensive about the DIAD IV because the device can associate a misdelivery with an individual driver. The system is designed to make drivers more accountable for their performance, but Levis acknowledges the information could be misused. Thus, he has been drilling into managers' heads that the driver information isn't to be used for discipline.

Likewise, locomotive engineers for CSX, the largest rail network in the Eastern United States, were not used to having their performance observed minute-by-minute. Historically, they learned the nuances of their storied trade mostly from other engineers, without input from supervisors. "It was all on-the-job training," says Matt Gross, a road foreman and a former engineer. One thing engineers learned was to

ignore the speed limit when they could (just as automobile drivers do), expending more fuel and wearing out the engine faster in the process.

Although the engineers received yearly visits from road foremen like Gross, like most human beings, they put on a good show for the supervisor's annual ride-along. "If someone knows they're being monitored, they tend to behave in a different manner," observes Gross.

Then in 2004, CSX deployed the event recorder automated download (ERAD). Similar to the "black box" in an airplane, ERAD logs how the engineer handles the locomotive: how hard and how often he brakes, how much fuel he uses and whether the train is going down a hill or is on a straightaway. The data is wirelessly transmitted to access points along the routes, which in turn feed a rules-based back-office system that creates metrics and scorecards for engineer feedback.

However, the engineers were apprehensive about giving management that unprecedented window into their performance. "When you roll out anything new, there's always a level of misunderstanding and fear," Gross says. "It takes time; there's still some guys that don't understand it."

To quell engineers' fears, CSX provided documentation to explain how ERAD



Gregor Bailar, CIO of Capital One Financial, gave up his office to show the benefits of going mobile.

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works and what data it collects. But it's the responsibility of supervisors like Gross to continue educating the engineers about how the device can help them do a better job. ERAD encourages managers to take a more active role in the engineers' training, Gross says. For instance, if ERAD notes an exception to the locomotive operating rules (say the engineer was speeding), Gross has to show the engineer his scorecard, which details—using charts that show speed, distance traveled and other metrics—what he did wrong. Then Gross tells the engineer what he is expected to do instead in order to operate the train in the safest, most cost-effective way. "We haven't used it as a disciplinary tool," he says. But getting engineers to respond to the feedback they get is an ongoing process. "We're starting to get the behavior we want," says Gross, whose own performance evaluation depends on how well his 160 reports are handling their locomotives.

In fact, ERAD has filled what CSX executives considered to be an ongoing training gap, which they were aware of but hadn't known how to address. "We want to continue training and enforcement of rules, and continually reinforce best practices through observation," says John West, president of CSX Technology. Ensuring engineers follow the rules saves money. This year alone, CSX claims unprecedented fuel savings because engineers are handling the locomotives more effectively. Given that each locomotive holds 5,000 gallons of diesel, the improved performance is worth millions.

But the impact transcends finances, according to West. "This is just the start of the opportunity of working with these guys more closely," he says. "It is changing the way we run our business and changing the way folks in the field operate."

3. Rework IT Processes

Although acclimating end users to wireless technology commands the most attention during a deployment, CIOs can't neglect the IT staffers who need to be trained to

Deploying wireless technology requires a phased approach that minimizes employees' dislocation.

support the new equipment.

Five years ago, when VP and CIO Eric Yablonka gazed on the hole in the ground that would become the University of Chicago Comer Childrens Hospital building, he saw a technology greenfield. There, he planted a broadband wireless infrastructure. Yablonka knew wireless technologies were becoming more important to hospital operations because medical staff are mobile and the latest medical equipment, such as IV pumps and cardiac monitors, is being built with wireless capabilities.

By building a wireless broadband network into the hospital's infrastructure, Yablonka would be able to support all the wireless-enabled equipment. He would also help the hospital staff achieve one of its top goals for the 155-bed pediatrics facility: making the hospital quieter. He was able to forgo the traditional (and disruptive) overhead loudspeaker system by equipping nurses with VoIP mobile phones. Not only have the phones cut the noise level, but nurses can also respond to patients more quickly. The cycle time from patient call to nurse response has been reduced significantly, Yablonka says, because nurses can be called from anywhere in the building.

But when the project started, Yablonka's staff wasn't large enough, nor did it have all of the necessary skills to build and support a wireless network, including the expertise to support the equipment that routed calls for the VoIP system. The nurses' VoIP phones caused subtle changes in the IT department's processes, including how different types of alarms and patient calls are routed through the network, Yablonka says.

He brought in vendors to design and build the broadband infrastructure so that his staffers could shadow their technicians. UCH IT staff also worked alongside the vendor reps as they troubleshot VoIP router problems.

The deployment of the wireless infrastructure was one of the catalysts for bringing the clinical engineering staff—those who service patient-facing devices such as IV pumps—under IT's umbrella. Yablonka wanted to unite the two support teams because more and more patient devices are computerized and can transmit data wirelessly.

It wasn't hard to sell the wireless technology to the IT staff, because they wanted to learn new skills, but Yablonka had to ensure that the clinical staff understood why wireless broadband was so important to UCH's future. "I don't recall anyone really resisting, but they hadn't thought through the implications" of the convergence of IT and medicine, Yablonka says.

Yablonka sold the project as an opportunity for the clinical staff to learn about the latest medical devices, which would become critical as other UCH buildings were retrofitted with the wireless networks.

And because he spent time managing the expectations both of end users and his own staff about what working wirelessly would mean to them, he's reaping the reward of their enthusiasm and excitement. "They now see the possibilities of this convergence, and see opportunity and career growth," Yablonka says. "They know we're doing something special here." **CIO**

End Users Hate Change

Winners say the greatest opposition to innovative initiatives comes most often from business unit staff.

Senior Writer Thomas Wailgum writes frequently about wireless technology. Send him your feedback at twailgum@cio.com.

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Thomas W. Shelman, VP and CIO
Ronald D. Sugar, Chairman and CEO
FY05 revenue: \$30.7 billion
Employees: 125,000

Agriculture/Construction

Monsanto

St. Louis
www.monsanto.com
Business function: Research & development
Business goal: Competitive advantage
Mark Showers, CIO
Hugh Grant, Chairman, President and CEO
FY05 revenue: \$6.3 billion
Employees: approximately 14,000

Automotive/Transportation

A. Duie Pyle

West Chester, Pa.
www.pyleco.com
Business function: Asset management/maintenance, supply chain/logistics, customer service/support
Business goal: Efficiency/increased productivity

Jim Dobson, CIO
Peter Latta, Chairman
FY05 revenue: \$180 million
Employees: 1,850

APL Logistics

Oakland, Calif.
www.apllogistics.com
Business function: Supply chain/logistics
Business goal: Efficiency/increased productivity
Wu Choy Peng, CIO
David Lim, Interim CEO
FY05 revenue: \$1.29 billion
Employees: 4,000

Con-way

San Mateo, Calif.
www.con-way.com
Business function: Supply chain/logistics, order processing/fulfillment, customer service/support
Business goal: Efficiency/increased productivity
Jacqueline Barretta, VP and CIO
Douglas Stotlar, President and CEO
FY05 revenue: \$4.17 billion
Employees: 24,000

CSX

Jacksonville, Fla.
www.csx.com
Business function: Supply chain/logistics
Business goal: Efficiency/increased productivity
John L. West, President, CSX Technology
Michael J. Ward, Chairman, President and CEO
FY05 revenue: \$8.6 billion
Employees: 32,000+

FedEx Ground Package System

Moon Township, Pa.
www.fedex.com
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Business goal: Efficiency/increased productivity
Michael V. Hmel, CIO
Daniel J. Sullivan, President and CEO
FY05 revenue: \$4.69 billion
Employees: 53,000 (including contract drivers)

General Motors

Detroit
www.gm.com
Business function: Customer service/support, IT operations
Business goal: Competitive advantage
Ralph Szygenda, Group VP of IS and CIO
G. Richard Wagoner, Chairman and CEO
FY05 revenue: \$192.6 billion
Employees: 327,000

The Goodyear Tire & Rubber Co.

Akron, Ohio
www.goodyear.com
Business function: Research & development, marketing, sales
Business goal: Competitive advantage
Stephanie K. Wernet, VP of IT and CIO
Robert J. Keegan, Chairman, President and CEO
FY05 revenue: \$19.7 billion
Employees: more than 80,000

Panasonic Automotive Systems Co. of America

Peachtree City, Ga.
www.panasonic.com
Business function: Accounting &

finance, inventory management, supply chain/logistics
Business goal: Supply chain
Raj Datt, VP and CIO
Vince Serrecchia, President
FY05 revenue: \$1.3 billion
Employees: 1,345

Sirva

Westmont, Ill.
www.sirva.com
Business function: Accounting & finance
Business goal: Efficiency/increased productivity
Eric Dirst, CIO
Brian Kelley, President, CEO and Director
FY05 revenue: \$3.6 billion (estimate)
Employees: 6,000

Trico Products

Rochester Hills, Mich.
www.tricoproducts.com
Business function: Research & development, manufacturing, supply chain/logistics
Business goal: Efficiency/increased productivity
Darren Millar, CIO
David Cumming, President
FY05 revenue: \$500 million
Employees: 4,500

United Parcel Service

Atlanta
www.ups.com
Business function: Supply chain/logistics, customer service/support
Business goal: Efficiency/increased productivity
Dave Barnes, Senior VP and CIO
Mike Eskew, Chairman and CEO
FY05 revenue: \$42.6 billion
Employees: 407,000

Company information provided by honorees in their award applications.
For an alphabetical listing of all honorees, see Page 104.

Washington Metropolitan Area Transit Authority

Washington, D.C.
www.wmata.com
Business function: Human resources, IT operations, asset management/maintenance, accounting & finance
Business goal: Competitive advantage
J. Roderick Burfield, Deputy Assistant General Manager
Daniel Tangherlini, General Manager
FY05 revenue: \$1 billion
Employees: 10,000

YRC Worldwide

Overland Park, Kan.
www.yrcw.com
Business function: Supply chain/logistics, order processing/fulfillment, customer service/support
Business goal: Efficiency/increased productivity
Michael Rapken, Senior VP and CIO
William D. Zollars, Chairman, President and CEO
FY05 revenue: \$8.7 billion
Employees: 70,000

Business Services/Consulting**KnowledgeBase Marketing**

Richardson, Texas
www.knowledgebasemarketing.com
Business function: NA
Business goal: Efficiency/increased productivity
Brian Camp, Senior VP of Infrastructure
Gary Laben, President and CEO
FY05 revenue: \$7.5 billion
Employees: NA

Nielsen Media Research

Oldsmar, Fla.
www.nielsenmedia.com
Business function: Sales, customer service/support, IT operations
Business goal: Efficiency/increased productivity
Kim Ross, CIO
Susan Whiting, President and CEO
FY05 revenue: NA
Employees: 3,000

Education/Nonprofit**Ball State University**

Muncie, Ind.
www.bsu.edu
Business function: Human resources, research & development, marketing, sales, customer service/support, IT operations
Business goal: Business innovation
H. O'Neal Smitherman, VP of IT
Jo Ann M. Gora, President
FY05 revenue: \$252 million
Employees: 3,479

Case Western Reserve University

Cleveland
www.case.edu
Business function: IT operations, research & development
Business goal: Business innovation
Lev Gonick, VP and CIO
Gregory Eastwood, Interim President
FY05 revenue: \$680 million
Employees: 5,000

Drexel University

Philadelphia
www.drexel.edu
Business function: Accounting & finance, customer service/support, IT operations
Business goal: Efficiency/increased productivity
John A. Bielec, VP of Information Resources and Technology
Constantine Papadakis, President
FY05 revenue: \$570 million
Employees: 4,100

Fairfax County Public Schools

Falls Church, Va.
www.fcps.edu
Business function: Customer service/support, IT operations
Business goal: Efficiency/increased productivity
Maribeth Luftglass, Assistant Superintendent and CIO
Jack D. Dale, Division Superintendent
FY05 revenue: \$1.9 billion
Employees: 21,859

Goodwill Industries International

Rockville, Md.
www.goodwill.org
Business function: NA
Business goal: Efficiency/increased productivity
Steve Bergman, CIO
George Kessinger, President, CEO and Director
FY05 revenue: \$17.8 million
Employees: 100

Intrax Cultural Exchange

San Francisco
www.intraxinc.com
Business function: Inventory management, supply chain/logistics, customer service/support
Business goal: Business innovation
Mark Schwartz, Senior VP of IT and CIO
John Wilhelm, President and CEO
FY05 revenue: \$30 million+
Employees: 200

MediSend International

Dallas
www.medisend.org
Business function: Accounting & finance, asset management/maintenance, inventory management, supply chain/logistics, marketing, sales, order processing/fulfillment,

customer service/support, IT operations
Business goal: Supply chain
Jeff Douglas, CIO and IT Director
Nick Hallack, President and CEO
FY05 revenue: \$1.6 million
Employees: 15

Nanyang Polytechnic

Singapore
www.nyp.edu.sg
Business function: Accounting & finance, human resources, customer service/support, IT operations
Business goal: Efficiency/increased productivity
Chiang Kah Kee, CIO
Lin Cheng Ton, Principal and CEO
FY05 revenue: NA
Employees: 1,181

NOAA Undersea Research Center

Key Largo, Fla.
www.uncw.edu/aquarius
Business function: Research & development, IT operations
Business goal: Competitive advantage
Dominic Landucci, Network Administrator and Aquarius Dive Technician
Andrew N. Shepard, Director
FY05 revenue: \$3 million
Employees: 25

Oregon State University

Corvallis, Ore.
oregonstate.edu
Business function: Research & development, IT operations
Business goal: Efficiency/increased productivity
Curt Pederson, Vice Provost for Information Services and CIO
Ed Ray, President
FY05 revenue: \$566.8 million
Employees: 9,594

University of Missouri-Rolla

Rolla, Mo.
www.umr.edu
Business function: Marketing, IT operations
Business goal: Competitive advantage
Randy M. Tucker, CIO
John F. Carney III, Chancellor
FY05 revenue: \$132.2 million
Employees: 1,000

University of Rochester

Rochester, N.Y.
www.rochester.edu
Business function: Research & development, IT operations
Business goal: Efficiency/increased productivity
David Lewis, Interim CIO
Joel Seligman, President
FY05 operating budget: \$1.9 billion
Employees: 17,075

Wake Forest University

Winston-Salem, N.C.
www.wfu.edu
Business function: Research & development, customer service/support, IT operations
Business goal: Competitive advantage
Jay L. Dominick, CIO and Assistant VP of IS
Nathan O. Hatch, President
FY05 endowment income: \$906.8 million
Employees: 5,637

Finance/Banking/Accounting**Capital One Financial**

McLean, Va.
www.capitalone.com
Business function: Human resources, asset management/maintenance, IT operations
Business goal: Efficiency/increased productivity
Gregor Bailar, Executive VP and CIO
Richard Fairbank, Chairman, President and CEO
FY05 revenue: \$12.2 billion
Employees: 21,000

CompuCredit

Atlanta
www.compucredit.com
Business function: Marketing, order processing/fulfillment, customer service/support
Business goal: Competitive advantage
Guido F. Sacchi, CIO and Executive Director
David G. Hanna, Chairman and CEO
FY05 revenue: \$774 million
Employees: 3,400

Deutsche Bank Securities

New York City
www.db.com
Business function: Research & development, marketing, sales
Business goal: Competitive advantage
Tony McCarthy, Managing Director and Global CIO,
Investment Banking Technology
Josef Ackermann, Chairman
FY05 revenue: \$29.9 billion
Employees: 64,103

Discover Financial Services

Riverwoods, Ill.
www.discovercard.com
Business function: Marketing, customer service/support, IT operations
Business goal: Business innovation
Diane Offereins, Executive VP and CIO
David Nelms, Chairman and CEO
FY05 revenue: \$3.5 billion
Employees: 13,683

E-Trade Financial

New York City
www.etrade.com
Business function: Customer service/support
Business goal: Customer satisfaction
Gregory Framke, Executive VP and CIO
Mitchell Caplan, CEO and Director
FY05 revenue: \$1.7 billion
Employees: 3,823

Great American Financial Resources

Cincinnati
www.gafri.com
Business function: Sales, order processing/fulfillment, customer service/support
Business goal: Efficiency/increased productivity
Jeff Wolverton, CIO
S. Craig Lindner, President and CEO
FY05 revenue: \$988.1 million
Employees: 800

ING Group

Amsterdam
www.ing.com
Business function: Marketing, customer service/support, IT operations
Business goal: Customer satisfaction
Michael Vincent, General Manager of Corporate Operations & Information Services
Michel Tilmant, CEO and Chairman
FY05 revenue: \$8.6 billion
Employees: 114,000

Little & Co.

Lowell, Mass.
www.little.com
Business function: Accounting & finance, sales, customer service/support
Business goal: Competitive advantage
Dave Kamins, CIO
Tim Little, CEO
FY05 revenue: \$34.8 million
Employees: 40

Lord, Abbett & Co.

Jersey City, N.J.
www.lordabbett.com
Business function: Sales, customer service/support
Business goal: Customer satisfaction
Michael Radziemski, Partner and CIO
Robert S. Dow, Managing Partner
FY05 revenue: NA
Employees: 750

MoneyGram International

St. Louis Park, Minn.
www.moneygram.com
Business function: Marketing, sales, IT operations
Business goal: Competitive advantage

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David A. Albright, Executive VP and CIO
Philip W. Milne, President, CEO and Director
FY05 revenue: \$971.2 million
Employees: 1,800

PNC Financial Services Group
Pittsburgh
www.pnc.com
Business function: Sales, customer service/support
Business goal: Efficiency/increased productivity
Timothy G. Shack, Executive VP and CIO
James E. Rohr, Chairman and CEO
FY05 revenue: \$6.3 billion
Employees: 24,314

Quicken Loans
Livonia, Mich.
www.quickenloans.com
Business function: Marketing, sales, order processing/fulfillment
Business goal: Customer satisfaction
Todd Lunsford, CIO
Bill Emerson, CEO
FY05 revenue: \$554 million
Employees: 3,500

Royal Bank of Canada
Toronto
www.rbc.com
Business function: Research & development, supply chain/logistics, customer service/support, IT operations
Business goal: Customer satisfaction
Martin Lippert, Group Head of Global Technology and Operations
Gordon Nixon, President, CEO and Director
FY05 revenue: \$1.7 billion
Employees: 70,000

Russell Investment Group
Tacoma, Wash.
www.russell.com
Business function: IT operations
Business goal: Efficiency/increased productivity
Jim Wallace, Chief Information and Operations Officer
Craig Ueland, President and CEO
FY05 revenue: \$1.1 billion
Employees: 1,912

Society of Worldwide Interbank Financial Telecommunication
La Hulpe, Belgium
www.swift.com
Business function: Marketing, sales, IT operations
Business goal: Efficiency/increased productivity
Joseph Eng, CIO
Leonard H. Schrank, CEO
FY05 revenue: \$696.4 million
Employees: 1,708

Taleo
San Francisco
www.taleo.com
Business function: Customer service/support, IT operations
Business goal: Efficiency/increased productivity
Bradford Benson, Executive VP of Products and Technology and CTO
Michael Gregoire, President and CEO
FY05 revenue: \$78.4 million
Employees: 512

Vanguard
Valley Forge, Pa.
www.vanguard.com
Business function: Research & development
Business goal: Competitive advantage
Tim Buckley, Managing Director of IT
John J. Brennan, Chairman and CEO
FY05 revenue: NA
Employees: 11,308

Wells Fargo Wholesale Internet & Treasury Solutions
San Francisco
www.wellsfargo.com/com
Business function: Accounting & finance
Business goal: Efficiency/increased productivity
Danny Peltz, Executive VP
Richard Kovacevich, CEO
FY05 revenue: \$453 billion
Employees: 152,000

Government

Afloat Training Group
San Diego
www.atg.surfor.navy.mil
Business function: Human resources, customer service/support
Business goal: Global operations
William Stegner, Director of Internet Systems
Capt. Michael Boyd, Director of Training
FY05 budget: \$3 million
Employees: 490

Air Force Reserve Command, HQ
Robins Air Force Base, Ga.
www.afrc.af.mil
Business function: Human resources
Business goal: Efficiency/increased productivity
Col. John Hayes, CIO and Chief of Communications and IS
Gen. John Bradley, Commander
FY05 budget: \$3.8 billion
Employees: 74,000

Broward County
Fort Lauderdale, Fla.
www.broward.org
Business function: Asset management/maintenance, customer service/support, IT operations

Business goal: Customer satisfaction
Nicole Fontayne, CIO
Bertha Henry, Interim County Administrator
FY05 revenue: \$3 billion
Employees: 7,000

Defense Logistics Agency
Fort Belvoir, Va.
www.dla.mil
Business function: Accounting & finance, human resources, IT operations
Business goal: Supply chain
Mae De Vincentis, CIO
Vice Adm. Keith W. Lippert, Director
FY05 revenue: \$31.8 billion
Employees: 22,208

Federal Financial Institutions Examination Council
Arlington, Va.
www.ffiec.gov
Business function: Accounting & finance, customer service/support, IT operations
Business goal: Efficiency/increased productivity
Michael Bartell, CIO and Director of IT, FDIC
Sheila Bair, Chairman
FY05 budget: \$1.4 billion
Employees: 2,274

Iowa Department of Administrative Services
Des Moines, Iowa
das.iowa.gov
Business function: Accounting & finance, marketing, customer service/support
Business goal: Customer satisfaction
John Gillispie, COO
Mollie Anderson, Director
FY05 revenue: approximately \$164 million
Employees: 365

King County
Seattle
www.metrokc.gov
Business function: Supply chain/logistics, customer service/support
Business goal: Efficiency/increased productivity
David Martinez, CIO
Ron Sims, County Executive
FY05 revenue: \$3.1 billion
Employees: 16,000

Oakland County
Pontiac, Mich.
www.oakgov.com
Business function: Customer service/support
Business goal: Business innovation
Robert J. Daddow, Deputy County Executive/Special Projects
L. Brooks Patterson, County Executive
FY05 revenue: \$700 million
Employees: 4,000

Pierce County
Tacoma, Wash.
www.piercecountywa.org
Business function: Customer service/support, IT operations
Business goal: Business innovation
Terry Hale, Director of IT
John Ladenburg, County Executive
FY05 revenue: \$20.2 million
Employees: 130

Pitt County
Greenville, N.C.
www.pittcountync.gov
Business function: Customer service/support
Business goal: Business innovation
Michael C. Taylor, CIO
D. Scott Elliott, County Manager
FY05 revenue: \$193.9 million
Employees: 1,000

Sarasota County
Sarasota, Fla.
www.scgov.net
Business function: Accounting & finance, human resources
Business goal: Efficiency/increased productivity
Bob Hanson, CIO
James L. Ley, CEO
FY05 revenue: \$1 billion
Employees: 3,620

U.S. Marine Corps Systems Command
Quantico, Va.
www.marcorsyscom.usmc.mil
Business function: Research & development, supply chain/logistics
Business goal: Customer satisfaction
Lt. Col. Ben Allegretti, CIO
Maj. Gen. William D. Catto, Commanding General
FY05 budget: \$7 billion
Employees: 2,500

Washtenaw County
Ann Arbor, Mich.
www.ewashtenaw.org
Business function: Customer service/support
Business goal: Customer satisfaction
David Behen, County Manager
Robert E. Guenzel, Administrator
FY05 revenue: \$178 million
Employees: 1,340

Health Care

Advanced Health Media
Union, N.J.
www.ahmdirect.com
Business function: Accounting & finance, marketing, order processing/fulfillment, customer service/support
Business goal: Business innovation
Greg Miller, Senior VP of IT
Kevin McMurtry, CEO and Founding Partner
FY05 revenue: \$120.2 million
Employees: 250

Alere Medical
Reno, Nev.
www.alere.com
Business function: Sales, order processing/fulfillment, customer service/support
Business goal: Competitive advantage
Jeff Roggensack, VP of IS and Technology
Ron Geraty, President and CEO
FY05 revenue: \$45.5 million
Employees: 200

Applera
Norwalk, Conn.
www.applera.com
Business function: Research & development/product development
Business goal: Business innovation
Tama Olver, VP and CIO
Tony White, Chairman, President and CEO
FY05 revenue: \$1.8 billion
Employees: 5,000

Baptist Health South Florida
Coral Gables, Fla.
www.baptisthealth.net
Business function: Accounting & finance, marketing, customer service/support
Business goal: Customer satisfaction
Mimi Taylor, Corporate VP of IT and CIO
Brian E. Keeley, President and CEO
FY05 revenue: NA
Employees: 11,000

Hygeia
Miami Lakes, Fla.
www.hygeia.net
Business function: Sales, order processing/fulfillment, customer service/support
Business goal: Competitive advantage
Rod Hamilton, CIO
Virgil Bretz, CEO
FY05 revenue: NA
Employees: 93

Lance Armstrong Foundation
Austin, Texas
www.livestrong.org
Business function: Accounting & finance, order processing/fulfillment, customer service/support
Business goal: Efficiency/increased productivity
Rodney White, Director of IS
Mitch Stoller, President and CEO
FY05 revenue: \$61 million
Employees: 65



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- Source: Wave Ranking for Service Desk, Q1 2006

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Get Out in Front.

Lifespan

Providence, R.I.
www.lifespan.org
 Business function: Customer service/support
 Business goal: Efficiency/increased productivity
 Carole M. Cotter, Senior VP and CIO
 George A. Vecchione, President and CEO
 FY05 revenue: \$1.3 billion
 Employees: 11,035

Ochsner Clinic Foundation

New Orleans
www.ochsner.org
 Business function: Research & development, customer service/support
 Business goal: Efficiency/increased productivity
 Lynn Witherspoon, CIO
 Patrick Quinlan, CEO
 FY04 revenue: \$772 million
 Employees: 6,000+

The Ohio State University Medical Center

Columbus, Ohio
www.medicalcenter.osu.edu
 Business function: Supply chain/logistics, order processing/fulfillment, customer service/support
 Business goal: Supply chain
 Detlev Smaltz, CIO
 Fred Sanfilippo, CEO
 FY05 revenue: \$1.6 billion
 Employees: 13,000

Partners HealthCare

Boston
www.partners.org
 Business function: Research & development, customer service/support
 Business goal: Efficiency/increased productivity
 John Glaser, VP and CIO
 James J. Mongan, President and CEO
 FY05 revenue: \$5.3 billion
 Employees: 37,000

Pfizer

New York City
www.pfizer.com
 Business function: Supply chain/logistics, customer service/support
 Business goal: Supply chain
 Mark Kuester, VP of IT, Global Manufacturing
 Nat Ricciardi, President
 FY05 revenue: \$51.2 billion
 Employees: 105,000

SRL Ranbaxy

Mumbai
www.srlworld.com
 Business function: Accounting & finance, manufacturing, inventory management
 Business goal: Business innovation
 G Radhakrishna Pillai, Head of IT
 J.S. Puri, CEO
 FY05 revenue: NA
 Employees: 650

The University of Chicago Hospitals

Chicago
www.uchospitals.edu
 Business function: Customer service/support
 Business goal: Efficiency/increased productivity
 Eric B. Yablonka, VP and CIO
 Kenneth P. Kates, Interim CEO
 FY05 revenue: \$869 million
 Employees: 6,000

The University of Texas M.D. Anderson Cancer Center

Houston
www.mdanderson.org
 Business function: Human resources, research & development, customer service/support
 Business goal: Business innovation
 Lynn H. Vogel, VP and CIO
 John Mendelsohn, President and CEO
 FY05 revenue: \$2.1 billion
 Employees: approximately 15,000

Hospitality/Travel**Harrahs Entertainment**

Las Vegas
www.harrahs.com
 Business function: Marketing, sales, customer service/support
 Business goal: Customer satisfaction
 Tim Stanley, CIO
 Gary Loveman, Chairman, CEO and President
 FY05 revenue: \$7.1 billion
 Employees: 85,000

Marriott International

Washington, D.C.
www.marriott.com
 Business function: Inventory management, customer service/support, IT operations
 Business goal: Efficiency/increased productivity
 Carl Wilson, Executive VP and CIO
 William J. Shaw, President and COO
 FY05 revenue: \$11.6 billion
 Employees: 143,000

Shell Vacations

Northbrook, Ill.
www.shellvacationsclub.com
 Business function: Sales
 Business goal: Competitive advantage
 Gary Gorson, CIO
 Sheldon Ginsburg, CEO
 FY05 revenue: \$354 million
 Employees: 2,500

Insurance**Aflac**

Columbus, Ga.
www.aflac.com
 Business function: Marketing, sales, IT operations
 Business goal: Efficiency/increased productivity
 Gerald W. Shields, Senior VP of IT and CIO
 Dan Amos, Chairman and CEO
 FY05 revenue: \$14.4 billion
 Employees: 4,207

AIG Domestic Brokerage Group

New York City
www.aig.com
 Business function: Order processing/fulfillment, customer service/support, IT operations
 Business goal: Competitive advantage
 Perry Rotella, CIO
 Kristian P. Moor, Executive VP, Domestic General Insurance
 FY05 revenue: \$23.1 billion
 Employees: 16,000

Highmark

Pittsburgh
www.highmark.com
 Business function: Marketing, sales, order processing/fulfillment, customer service/support
 Business goal: Efficiency/increased productivity
 Tom Tabor, CIO and Senior VP
 Kenneth Melani, President, CEO and Director
 FY05 revenue: \$9.6 billion
 Employees: 12,000

Manufacturing**Dell**

Round Rock, Texas
www.dell.com
 Business function: Accounting & finance, order processing/fulfillment, customer service/support
 Business goal: Global operations
 Susan E. Sheskey, VP and CIO
 Kevin B. Rollins, President, CEO and Director
 FY06 revenue: \$56 billion
 Employees: 65,200

Hitachi Global Storage Technologies

San Jose, Calif.
www.hitachigst.com
 Business function: Inventory management, supply chain/logistics, customer service/support
 Business goal: Efficiency/increased productivity
 Ranga Jayaraman, CIO
 Hiroaki Nakanishi, CEO
 FY05 revenue: \$4.5 billion
 Employees: 27,000

Intel

Santa Clara, Calif.
www.intel.com
 Business function: Research & development/product development, manufacturing, supply chain/logistics
 Business goal: Competitive advantage
 John Johnson, Director of IT
 Customer Services
 Paul S. Otellini, President, CEO and Director
 FY05 revenue: \$39 billion
 Employees: 100,000

International Truck and Engine

Warrenville, Ill.
www.internationaldelivers.com
 Business function: Manufacturing, order processing/fulfillment, customer service/support
 Business goal: Competitive advantage
 Art Data, VP of IT
 Dan Ustian, Chairman, President and CEO
 FY05 revenue: \$12 billion
 Employees: 17,522

The Procter & Gamble Co.

Cincinnati
www.pg.com
 Business function: Manufacturing, supply chain/logistics, marketing
 Business goal: Competitive advantage
 Filippo Passerini, CIO and Global Services Officer
 A.G. Lafley, Chairman, President and CEO
 FY05 revenue: \$56.7 billion
 Employees: 140,000

Mining/Oil & Gas**ConocoPhillips Refining and Marketing, Europe**

London
www.conocophillips.com
 Business function: Supply chain/logistics, marketing, customer service/support
 Business goal: Efficiency/increased productivity
 Denis Bailey, Manager, GIS Downstream Europe and Asia Pacific
 Mike Fretwell, President, International Downstream
 FY05 revenue: \$32.8 billion
 Employees: 4,000

Hess

New York City
www.hess.com
 Business function: Efficiency/increased productivity
 Business goal: Competitive advantage
 Peter Walton, VP and CIO
 John B. Hess, Chairman and CEO
 FY05 revenue: \$22.7 million
 Employees: 13,800

Real Estate/Legal**Cooper Communities**

Rogers, Ark.
www.cooper-communities.com
 Business function: Sales, customer service/support, IT operations
 Business goal: Business innovation
 Jim Craig, CIO and VP of IS
 John Cooper III, President
 FY05 revenue: NA
 Employees: 668

Foley & Lardner

Milwaukee
www.foley.com
 Business function: Sales, customer service/support
 Business goal: Competitive advantage
 Douglas D. Caddell, CIO
 Ralf Boer, CEO
 FY05 revenue: \$610 million
 Employees: 2,600

Nexsen Pruet Adams Kleemeier

Rock Hill, S.C.
www.nexsenpruet.com
 Business function: Sales, order processing/fulfillment, customer service/support
 Business goal: Competitive advantage
 Andy Shook, Director of IT, NP Closing Network
 David Hawkins, CEO
 FY05 revenue: \$71 million
 Employees: 450

Telecommunications**BT Group**

London
www.btplc.com
 Business function: Human resources, customer service/support, IT operations
 Business goal: Customer satisfaction
 Al-Noor Ramji, CIO
 Ben Verwaayen, CEO and Director
 FY05 revenue: \$32.5 billion
 Employees: approximately 100,000

Echostar Satellite

Englewood, Colo.
www.echostar.com
 Business function: Research & development, marketing, sales
 Business goal: Competitive advantage
 Robert A Strickland, CIO
 Charles Ergen, Chairman and CEO
 FY05 revenue: \$8.1 billion
 Employees: 20,000

{ Continued on Page 104 }

Are You Walking an IT Tightrope... Blindfolded?

You can't manage what you can't see

FACT #1: Corporations are spending \$130B per year on print & copy.

FACT #2: The average employee prints 650-1000 pages per month, at a cost of over \$750 per year.

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SESSION HIGHLIGHTS

Where's the Next Wave of IT Innovation Coming From?

If innovation is the key to the future, where are our next innovators going to come from and how will that affect businesses here and around the world?

Tapping Internal Creativity

Approaches to innovation can be as varied as the initiatives it produces. Foster creative thinking and your employees will provide original ideas and pioneer new products. Hear from CIO 100 winners who discovered and developed their internal innovation sources.

HOT TOPIC SOA—Are You Ready?

Service-oriented architecture (SOA) allows IT to respond quickly to new business needs to deliver applications in real time, or on demand. Discuss the latest developments and implementation strategies with this leader in the field.

Why Not "Not Invented Here"?

Innovation labs, design firms and consultants are playing an increasingly large role in the pursuit of innovative ideas. For many companies the once firmly held belief that innovation had to be homegrown is falling by the wayside. Learn how this company is maximizing their outsourcing partnerships, realizing a new way of doing business and generating innovation from outside the company.

Oh, And One More Thing....

What is it? What is the one thing more you need to know, learn and take away from this experience? Hear from an innovation guru on just what that one more thing might be.

WHO SHOULD ATTEND

Leaders in the CIO community, who want to explore how to develop, implement and capitalize on innovation.

In other words, you.

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Utilities**Atmos Energy**

Dallas
www.atmosenergy.com
Business function: Accounting & finance, asset management/maintenance, customer service/support
Business goal: Business innovation
 Les Duncan, VP and CIO
 Robert Best, Chairman, President and CEO
 FY05 revenue: \$5 billion
 Employees: 4,556

Austin Energy

Austin, Texas
www.austinenergy.com
Business function: Asset management/maintenance, order processing/fulfillment, customer service/support
Business goal: Business innovation
 Andres Carvallo, CIO

Juan Garza, General Manager
 FY05 revenue: \$1 billion
 Employees: 1,500

JEA

Jacksonville, Fla.
www.jea.com
Business function: Accounting & finance
Business goal: Efficiency/increased productivity
 Wanyonyi J. Kendrick, CIO
 James A. Dickenson, CEO
 FY05 revenue: \$1.2 billion
 Employees: 2,000

Southern Co.

Atlanta
www.southerncompany.com
Business function: Order processing/fulfillment, customer service/support
Business goal: Business continuity

Rebecca Blalock, Senior VP and CIO
 David Ratcliffe, Chairman, President and CEO
 FY05 revenue: \$13.6 billion
 Employees: 26,000 employees

Wholesale/Retail/Distribution**Berlin Packaging**

Chicago
www.berlinpackaging.com
Business function: Inventory management, supply chain/logistics, order processing/fulfillment
Business goal: Efficiency/increased productivity
 Steven Canter, CIO
 Andrew T. Berlin, President
 FY05 revenue: \$250 million
 Employees: 250

Dunham and Smith Agencies

St. Louis
www.dunhamandsmith.com
Business function: Supply chain/logistics, sales, customer service/support
Business goal: Competitive advantage
 Mike Skinner, VP and CIO
 Jed Becker, President and CEO
 FY05 revenue: \$200 million
 Employees: 800

Network Services

Mt. Prospect, Ill.
www.nsconline.com
Business function: Supply chain/logistics, sales, customer service/support
Business goal: Efficiency/increased productivity
 Paul Roche, CIO
 R. James Alexy, President and CEO
 FY05 revenue: \$620 million
 Employees: 130

More About the Honorees

To learn the details about this year's award-winning projects and create customized lists of the honorees by industry, company size and other characteristics, check out our CIO 100 honoree database at www.cio.com/cio100.

cio.com

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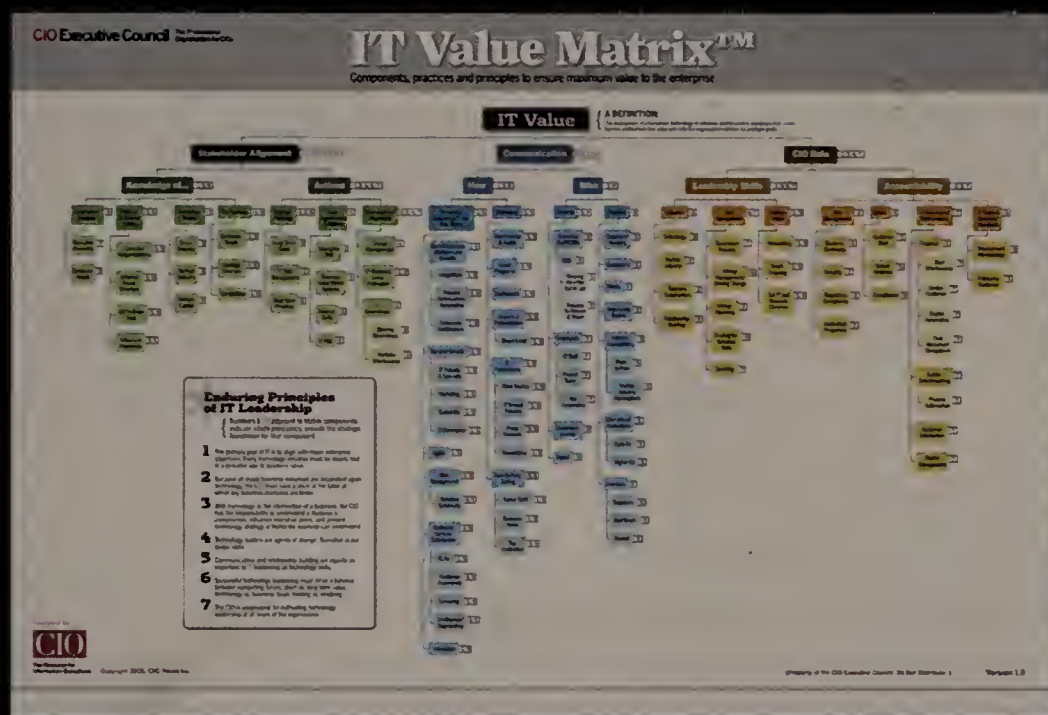
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How do you communicate IT's performance to the business?

Most CIOs know that communicating to the business about IT is a key part of their job, but many struggle to find the right strategy and tools for a certain internal audience or situation. The CIO Executive Council, a professional community developed by CIOs, has focused its members' collective effort on this challenge. Their initiative has resulted in groundbreaking tools—the IT Value Matrix and Knowledge Center™—to help leverage the value of IT throughout the organization.

The IT Value Matrix illustrates the principles and practices essential to creating, identifying and communicating IT's value to the enterprise. Its online Knowledge Center provides best practices contributed by Council members, supplemented by case studies and how-to articles from *CIO* magazine that are grouped in categories that correspond to all the components of the Matrix.



Get your own Matrix at www.cioexecutivecouncil.com/it_value and to watch the IT Value webcast, presented by Agrilience CIO and Council member Steven John.

Also, watch out for new tools developed by the Council members, including the upcoming IT Marketing Assessment Kit.

CIO Executive Council
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The CIO Executive Council was created by readers of *CIO* magazine and leaders within the community of CIOs to leverage the individual and collective strengths of its members by serving as unbiased and trusted advisors to each other, and by advancing the CIO role and profession. In just two years, more than 300 CIOs worldwide from various sectors and industries have identified with the Council's vision and committed to assist each other, cultivate their own careers and those of their team, and advance the role of the CIO. **To inquire about membership, visit www.cioexecutivecouncil.com.**

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Editorial, Advertising and

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You Might Be a CIO If You...

Only buy appliances that run on Linux.

...

Send your girlfriend an RFP instead of just asking her to marry you.

...

Give your kids SLAs instead of chores.

...

Use "text" as a verb.

...

Don't have a CD player, only a computer and an iPod.

Can type 50 wpm on a BlackBerry.

...

Were ticked off at the inaccurate description of a device configuration in the Harrison Ford thriller *Firewall*.

...

Refer to family members as "users." (Even once.)

...

Give a pep talk to your son's Little League team and mention the importance of proper alignment.

RSVP to invitations by listing the resources you'll need to attend.

...

Want a pizza but can't remember the number so you turn on your laptop, open a browser, Google the pizza place, go to its website, open a new tab to have the menu on the same screen as the phone number and then dial using your Skype account.... Instead of picking up the phone and dialing "4-1-1" in the first place.

Call the Worcestershire sauce "mission-critical" when you're grilling burgers.

...

Remind your family that their home PCs and Internet connections are up "99 percent of the time."

...

Ask the lawn guy if he'd be willing to cut his price if you acted as his vendor reference.

...

Would rather be in the office than on vacation.

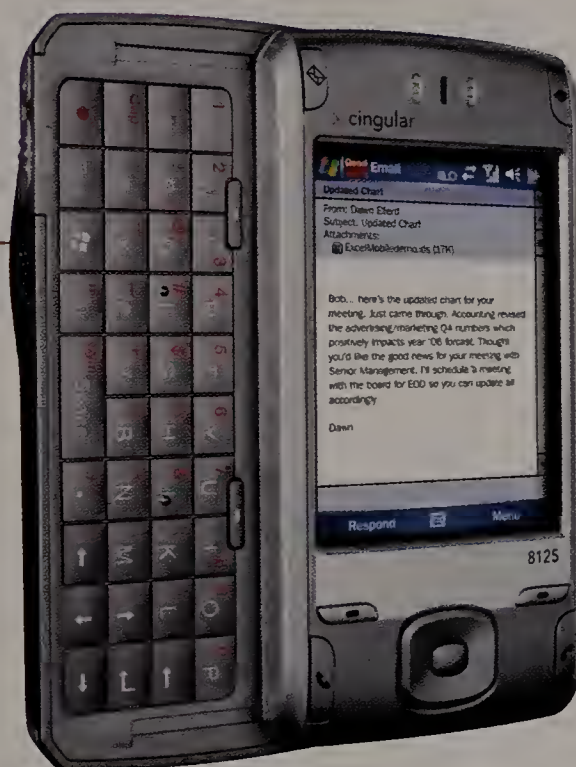


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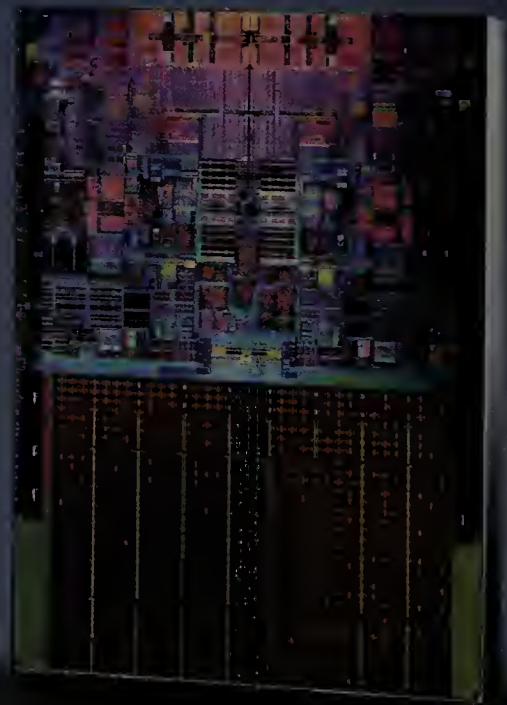


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